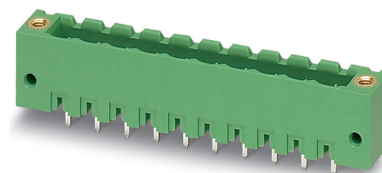


Order No.: 1777099

Type: MSTBV 2,5/ 4-GF-5,08

## PCB headers



The figure shows a 10-position version of the product

## 1 Main features



- |                         |                     |                        |                     |
|-------------------------|---------------------|------------------------|---------------------|
| • No. of pos.           | 4                   | • Nominal current      | 12 A                |
| • Nominal cross section | 2.5 mm <sup>2</sup> | • Nominal voltage      | 320 V               |
| • Color                 | green (6021)        | • Connection direction | 90 °                |
| • Pitch                 | 5.08 mm             | • Type of packaging    | packed in cardboard |
| • Mounting type         | Wave soldering      |                        |                     |

## 2 Your advantages

- ✓ Maximum flexibility when it comes to device design – one header for connectors with different connection technologies
- ✓ Well-known mounting principle allows worldwide use
- ✓ Vertical connection enables multi-row arrangement on the PCB
- ✓ Screwable flange for superior mechanical stability



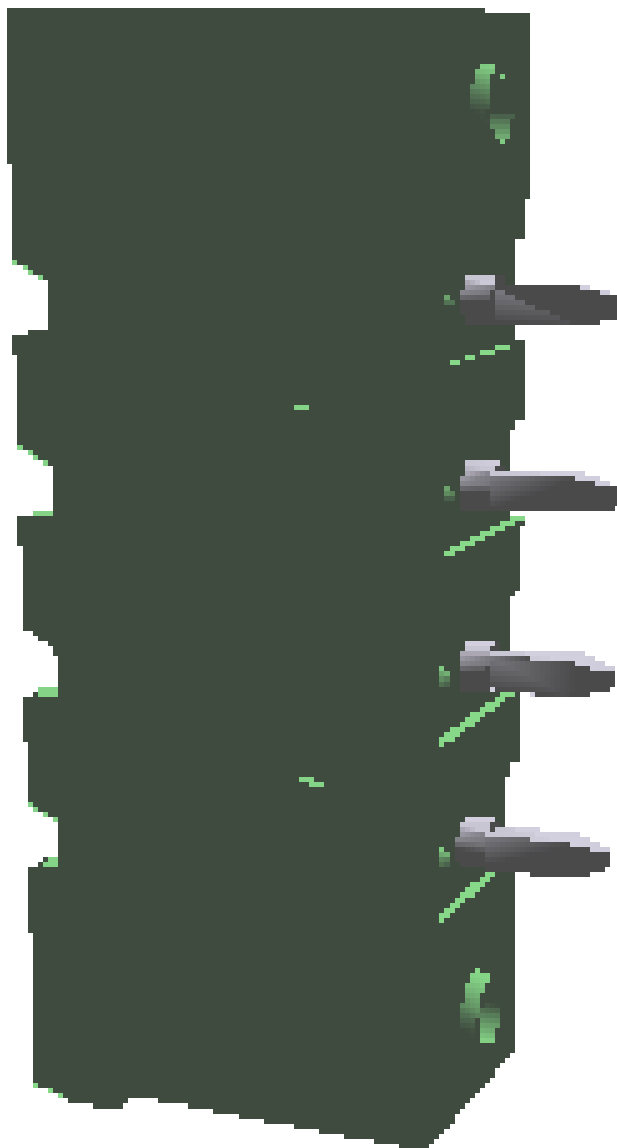
Make sure you always use the latest documentation.  
It can be downloaded at: [phoenixcontact.net/product/1777099](https://phoenixcontact.net/product/1777099)

**1777099 MSTBV 2,5/ 4-GF-5,08****3 Table of contents**

|      |                                                              |    |
|------|--------------------------------------------------------------|----|
| 1    | Main features .....                                          | 1  |
| 2    | Your advantages .....                                        | 1  |
| 3    | Table of contents .....                                      | 2  |
| 4    | 3D model in PDF can be activated (Acrobat Reader only) ..... | 3  |
| 5    | General Technical Data .....                                 | 4  |
| 5.1  | item properties .....                                        | 4  |
| 6    | Mounting.....                                                | 5  |
| 6.1  | Flange fixing .....                                          | 5  |
| 7    | Material properties.....                                     | 5  |
| 7.1  | Material of metal parts.....                                 | 5  |
| 8    | Dimensions.....                                              | 6  |
| 8.1  | Dimensions for the product .....                             | 6  |
| 9    | Series drawing.....                                          | 7  |
| 10   | Application.....                                             | 8  |
| 11   | Packaging information .....                                  | 8  |
| 11.1 | Temperature limit values .....                               | 8  |
| 12   | Mechanical tests.....                                        | 9  |
| 12.1 | Visual examination .....                                     | 9  |
| 12.2 | Dimensional test.....                                        | 9  |
| 12.3 | Resistance of marking .....                                  | 9  |
| 12.4 | Polarization and coding .....                                | 9  |
| 12.5 | Contact retention in insert .....                            | 9  |
| 13   | Insertion and withdrawal forces .....                        | 10 |
| 14   | Electrical tests .....                                       | 11 |
| 14.1 | Electrical data .....                                        | 11 |
| 14.2 | Air and creepage distances .....                             | 11 |
| 15   | Current carrying capacity/derating curves .....              | 12 |
| 15.1 | Insulation resistance.....                                   | 14 |
| 15.2 | Vibration test .....                                         | 14 |
| 16   | Approvals / Certificates.....                                | 15 |
| 17   | Commercial Data.....                                         | 16 |
| 18   | corresponding plugs .....                                    | 16 |
| 19   | Accessories .....                                            | 16 |
| 20   | Combination tests.....                                       | 18 |

1777099 MSTBV 2,5/ 4-GF-5,08

#### 4 3D model in PDF can be activated (Acrobat Reader only)



**1777099 MSTBV 2,5/ 4-GF-5,08****5 General Technical Data****5.1 item properties**

|                                                  |                      |
|--------------------------------------------------|----------------------|
| Order No.                                        | 1777099              |
| Type                                             | MSTBV 2,5/ 4-GF-5,08 |
| Plug-in system                                   | CLASSIC COMBICON     |
| Product type                                     | PCB headers          |
| Type of contact                                  | Male connector       |
| Range of articles                                | MSTBV 2,5/...-GF     |
| Pitch                                            | 5.08 mm              |
| Range of positions                               | 2...24               |
| Number of positions                              | 4                    |
| Number of levels                                 | 1                    |
| Number of connections                            | 4                    |
| Number of potentials                             | 4                    |
| Mounting type                                    | Wave soldering       |
| Connection direction of the connector to the PCB | 90 °                 |
| Pin layout                                       | Linear pinning       |
| Solder pins per potential                        | 1                    |
| Type                                             | Standard             |

**1777099 MSTBV 2,5/ 4-GF-5,08****6 Mounting****6.1 Flange fixing**

|                 |                 |
|-----------------|-----------------|
| Type of locking | Screw locking   |
| Mounting flange | Threaded flange |
| Torque          | 0.3 Nm          |

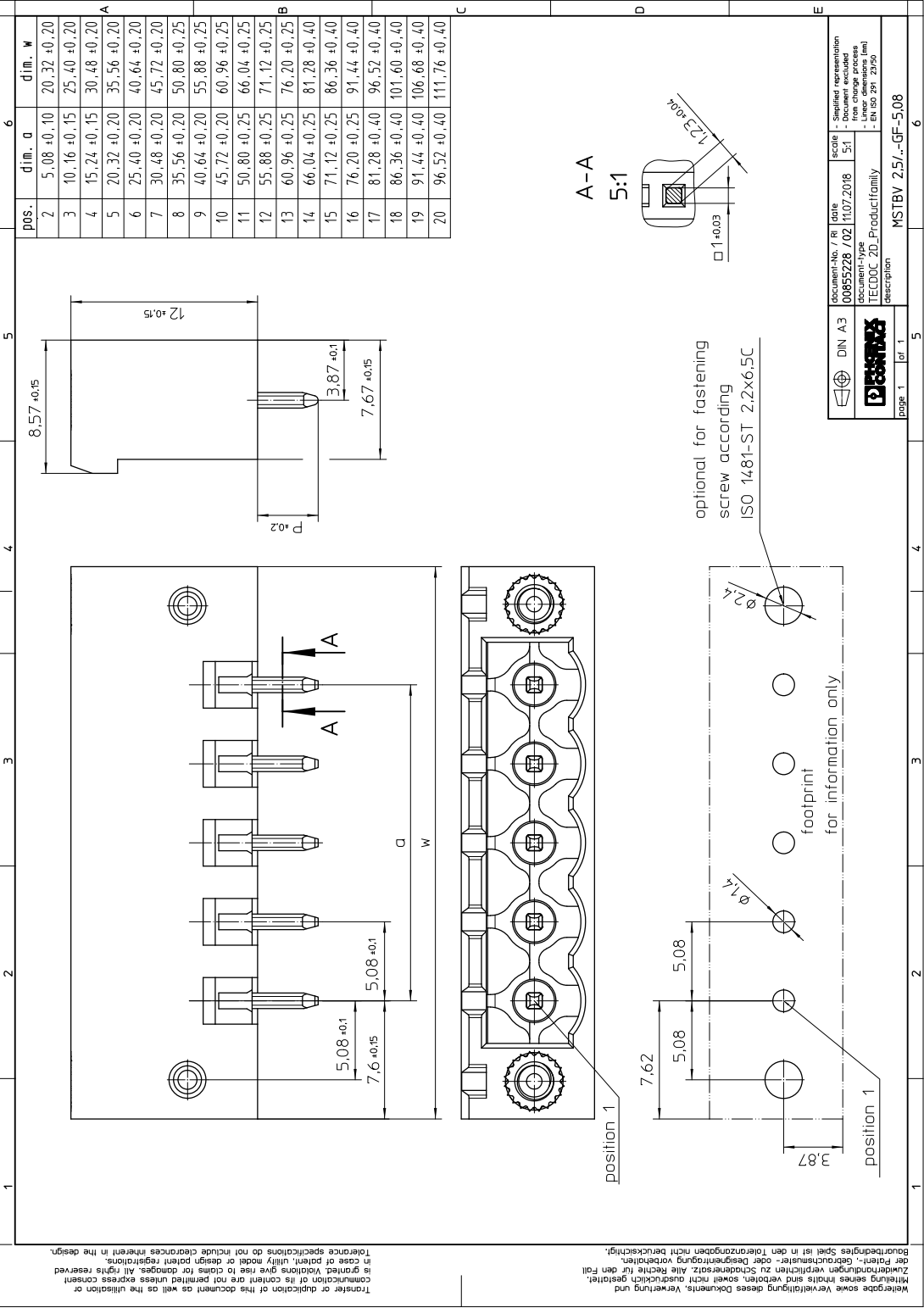
**7 Material properties****7.1 Material of metal parts**

|                                        |                                                                         |
|----------------------------------------|-------------------------------------------------------------------------|
| Note                                   | WEEE/RoHS-compliant, whisker-free acc. to IEC 60068-2-82/JEDEC JESD 201 |
| Contact material                       | Cu alloy                                                                |
| Surface contact area                   | Nickel (1.3 - 3 µm Ni), , Tin (3 - 5 µm Sn)                             |
| Soldering area surface                 | Nickel (1.3 - 3 µm Ni) , Tin (3 - 5 µm Sn)                              |
| Surface characteristics                | Tin-plated                                                              |
| Insulating material data               | Housing                                                                 |
| Color                                  | green (6021)                                                            |
| Insulating material                    | PBT                                                                     |
| Insulating material group              | IIIa                                                                    |
| CTI according to IEC 60112             | 225                                                                     |
| Flammability rating according to UL 94 | V0                                                                      |

**1777099 MSTBV 2,5/ 4-GF-5,08****8 Dimensions****8.1 Dimensions for the product**

|                             |          |
|-----------------------------|----------|
|                             |          |
| Length                      | 8.6 mm   |
| Width                       | 30.48 mm |
| Height (without solder pin) | 12 mm    |
| Total height                | 15.9 mm  |
| Solder pin [P]              | 3.9 mm   |
| Dimension a                 | 15.24 mm |

9 Series drawing



**1777099 MSTBV 2,5/ 4-GF-5,08****10 Application****11 Packaging information**

|                    |                     |
|--------------------|---------------------|
| Type of packaging  | packed in cardboard |
| Pieces per package | 250                 |

**11.1 Temperature limit values**

|                                         |                                                     |
|-----------------------------------------|-----------------------------------------------------|
| Ambient temperature (storage/transport) | -40 °C ... 70 °C                                    |
| Ambient temperature (assembly)          | -5 °C ... 100 °C                                    |
| Ambient temperature (operation)         | -40 °C ... 100 °C (dependent on the derating curve) |



**1777099 MSTBV 2,5/ 4-GF-5,08****12 Mechanical tests****12.1 Visual examination**

|                    |                       |
|--------------------|-----------------------|
| Specification      | IEC 61984:2008-10     |
| Visual examination | Test passed           |
| Specification      | IEC 60512-1-1:2002-02 |

**12.2 Dimensional test**

|                  |                       |
|------------------|-----------------------|
| Dimensional test | Test passed           |
| Specification    | IEC 60512-1-2:2002-02 |

**12.3 Resistance of marking**

|                       |                        |
|-----------------------|------------------------|
| Resistance of marking | Test passed            |
| Specification         | IEC 60068-2-70:1995-12 |

**12.4 Polarization and coding**

|                         |                        |
|-------------------------|------------------------|
| Polarization and coding | Test passed            |
| Specification           | IEC 60512-13-5:2006-02 |
| Test force              | 20 N                   |

**12.5 Contact retention in insert**

|                             |                        |
|-----------------------------|------------------------|
| Contact retention in insert | Test passed            |
| Specification               | IEC 60512-15-1:2008-05 |
| Test force per pos.         | 40 N                   |

**1777099 MSTBV 2,5/ 4-GF-5,08****13 Insertion and withdrawal forces**

Insertion and withdrawal force

Test passed

Specification

IEC 60512-13-2:2006-02

No. of cycles

25

Insertion strength per pos. approx.

8 N

Withdraw strength per pos. approx.

6 N

**1777099 MSTBV 2,5/ 4-GF-5,08****14 Electrical tests****14.1 Electrical data**

|                                         |                            |
|-----------------------------------------|----------------------------|
| Rated current / conductor cross section | 12 A / 2.5 mm <sup>2</sup> |
| Rated insulation voltage (III/2)        | 320 V                      |
| Rated surge voltage (III/2)             | 4 kV                       |
| Contact resistance                      | 2.5 mΩ                     |
| Degree of pollution                     | 2                          |

**14.2 Air and creepage distances**

|                                                                   |                     |        |       |
|-------------------------------------------------------------------|---------------------|--------|-------|
| Component                                                         | PCB headers         |        |       |
| Specification                                                     | IEC 60664-1:2007-04 |        |       |
| Mains type                                                        | unearthed mains     |        |       |
| Insulating material group                                         | IIIa                |        |       |
| Comparative tracking index (IEC 60112:2003-01)                    | CTI 225             |        |       |
| Rated insulation voltage                                          | 250 V               | 320 V  | 400 V |
| Rated surge voltage                                               | 4 kV                | 4 kV   | 4 kV  |
| Degree of pollution                                               | 3                   | 2      | 2     |
| Overvoltage category                                              | III                 | III    | II    |
| Minimum clearance case A (inhomogeneous field)                    | 3 mm                | 3 mm   | 3 mm  |
| Minimum value of the creepage path requirement in acc. with table | 4 mm                | 3.2 mm | 4 mm  |

## 1777099 MSTBV 2,5/ 4-GF-5,08

## 15 Current carrying capacity/derating curves

Specification

IEC 61984:2008-10

Note

Representation based on IEC 60512-5-2:2002-02

Note

For number of positions, see diagram

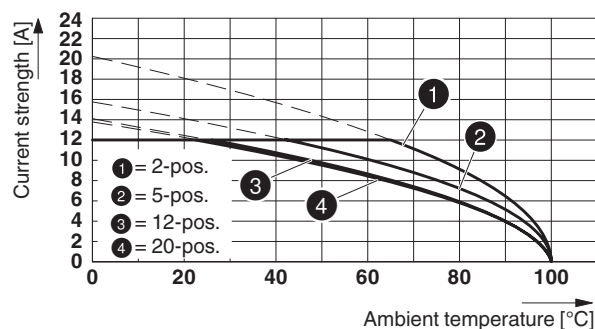
Reduction factor

0.8

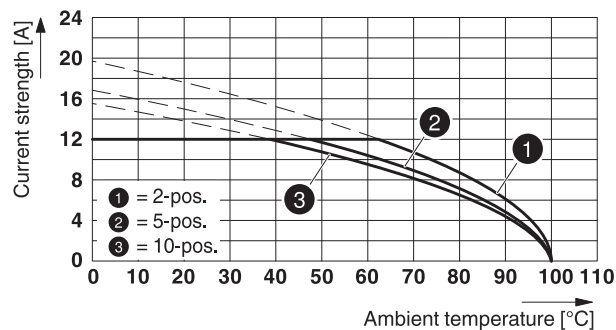
Conductor cross section

2.5 mm<sup>2</sup>

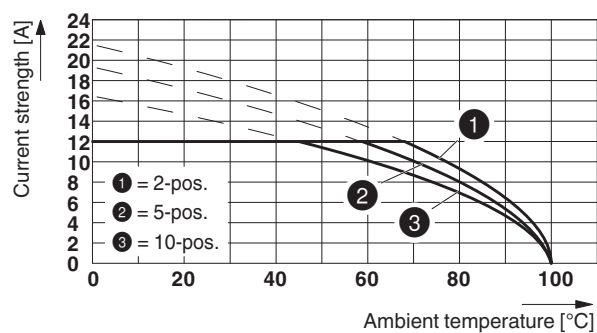
## Type: MSTB 2,5/...-STF-5,08 with MSTBV 2,5/...-GF-5,08

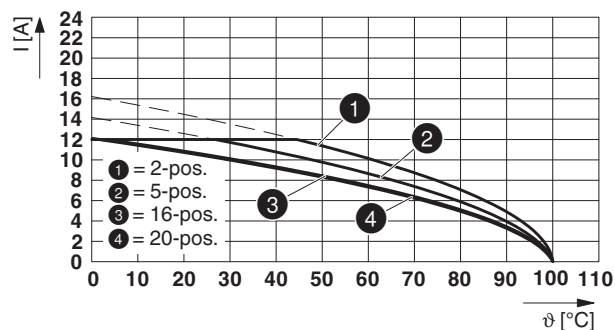
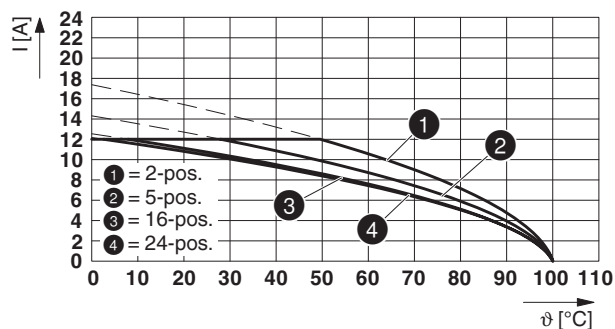
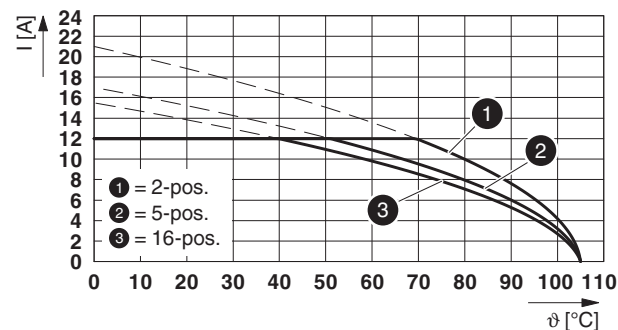
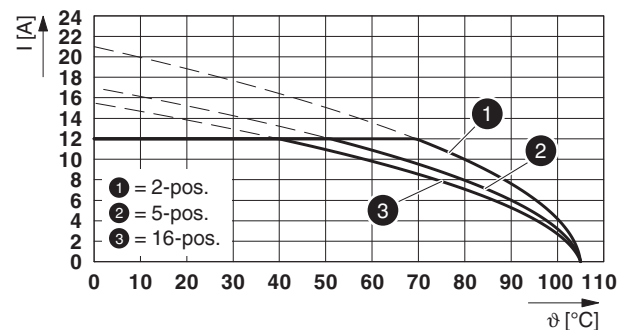


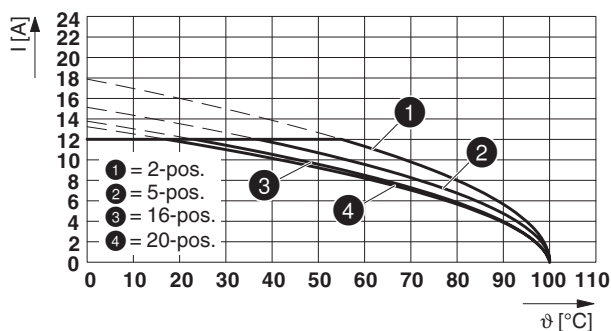
## Type: TVMSTB 2,5/...-STF-5,08 with MSTBV 2,5/...-GF-5,08



## Type: TFKC 2,5/...-STF-5,08 with MSTBV 2,5/...-GF-5,08



**1777099 MSTBV 2,5/ 4-GF-5,08****Type: MVSTB(R/W) 2,5/...-STF-5,08 with MSTBV 2,5/...-GF-5,08****Type: SMSTB 2,5/...-STF-5,08 with MSTBV 2,5/...-GF-5,08****Type: FKCVR 2,5/...-STF-5,08 with MSTBV 2,5/...-GF-5,08****Type: FKCVW 2,5/...-STF-5,08 with MSTBV 2,5/...-GF-5,08**

**1777099 MSTBV 2,5/ 4-GF-5,08****Type: FRONT-MSTB 2,5/...-STF-5,08 with MSTBV 2,5/...-GF-5,08****15.1 Insulation resistance**

|                                              |                       |
|----------------------------------------------|-----------------------|
| Specification                                | IEC 60512-3-1:2002-02 |
| Result                                       | Test passed           |
| Insulation resistance, neighboring positions | > 3 TΩ                |

**15.2 Vibration test**

|                        |                                                                                              |
|------------------------|----------------------------------------------------------------------------------------------|
| Specification          | IEC 60068-2-6:2007-12                                                                        |
| Result                 | Test passed                                                                                  |
| Frequency              | 10 - 150 - 10 Hz                                                                             |
| Sweep speed            | 1 octave/min                                                                                 |
| Amplitude              | 0.35 mm (10 - 60.1 Hz)                                                                       |
| Acceleration           | 5 g (60.1 - 150 Hz)                                                                          |
| Test duration per axis | 2.5 h                                                                                        |
| Test directions        | X-, Y- and Z-axis                                                                            |
| Note                   | The connected conductor loops were guided to the test sample at a distance of approx. 10 cm. |

## 1777099 MSTBV 2,5/ 4-GF-5,08

## 16 Approvals / Certificates

| CSA                     | Voltage<br>[V] | Current<br>[A] | Cross section<br>[AWG] | Cross section<br>[mm²] |
|----------------------------------------------------------------------------------------------------------|----------------|----------------|------------------------|------------------------|
| <b>Usegroup B</b>                                                                                        |                |                |                        |                        |
|                                                                                                          | 300 V          | 12 A           | -                      | -                      |
| <b>Usegroup D</b>                                                                                        |                |                |                        |                        |
|                                                                                                          | 300 V          | 10 A           | -                      | -                      |
| IECEE CB Scheme         | Voltage<br>[V] | Current<br>[A] | Cross section<br>[AWG] | Cross section<br>[mm²] |
|                                                                                                          | 250 V          | 12 A           | -                      | -                      |
| EAC                     |                |                |                        |                        |
| VDE Zeichengenehmigung  | Voltage<br>[V] | Current<br>[A] | Cross section<br>[AWG] | Cross section<br>[mm²] |
|                                                                                                          | 250 V          | 12 A           | -                      | -                      |
| cULus Recognized        | Voltage<br>[V] | Current<br>[A] | Cross section<br>[AWG] | Cross section<br>[mm²] |
| <b>Usegroup B</b>                                                                                        |                |                |                        |                        |
|                                                                                                          | 300 V          | 12 A           | -                      | -                      |
| <b>Usegroup D</b>                                                                                        |                |                |                        |                        |
|                                                                                                          | 300 V          | 10 A           | -                      | -                      |
| DNV GL                |                |                |                        |                        |
| RS                    |                |                |                        |                        |

**1777099 MSTBV 2,5/ 4-GF-5,08****17 Commercial Data**

|                    |                                                      |
|--------------------|------------------------------------------------------|
| Order No.          | 1777099                                              |
| Type               | MSTBV 2,5/ 4-GF-5,08                                 |
| Pieces per package | 250                                                  |
| Net weight         | 3 g                                                  |
| GTIN               | 4017918039264                                        |
|                    | Information that applies locally, see link on page 1 |
| Country of origin  | Information that applies locally, see link on page 1 |

**18 corresponding plugs**

| Order No. | Type                       |
|-----------|----------------------------|
| 1719118   | TVMSTB 2,5/ 4-STF-5,08     |
| 1754814   | FKCN 2,5/ 4-STF-5,08       |
| 1777824   | FRONT-MSTB 2,5/ 4-STF-5,08 |
| 1778001   | MSTB 2,5/ 4-STF-5,08       |
| 1805327   | MSTBT 2,5/ 4-STF-5,08      |
| 1809750   | MSTBC 2,5/ 4-STZF-5,08     |
| 1834929   | MVSTBW 2,5/ 4-STF-5,08     |
| 1835119   | MVSTBR 2,5/ 4-STF-5,08     |
| 1853120   | TMSTBP 2,5/ 4-STF-5,08     |
| 1873223   | FKC 2,5/ 4-STF-5,08        |
| 1873825   | FKCVW 2,5/ 4-STF-5,08      |
| 1874125   | FKCVR 2,5/ 4-STF-5,08      |
| 1883378   | QC 1/ 4-STF-5,08           |
| 1902327   | FKCT 2,5/ 4-STF-5,08       |
| 1962710   | TFKC 2,5/ 4-STF-5,08       |
| 1971086   | SMSTB 2,5/ 4-STF-5,08      |
| 1975286   | FKCS 2,5/ 4-STF-5,08       |

**19 Accessories**

| Description                                                                                                 | Order No. | Type                       |
|-------------------------------------------------------------------------------------------------------------|-----------|----------------------------|
| Coding section, inserted into the recess in the header or the inverted plug, red insulating material        | 1734401   | CR-MSTB                    |
|                                                                                                             | 0804293   | SK 5,08/3,8:FORTL.ZAHLEN   |
| Keying cap, for forming sections, plugs onto header pin, green insulating material                          | 1755477   | MSTB-BL                    |
|                                                                                                             | 0805412   | SK 5,08/3,8:UNBEDRUCKT     |
|                                                                                                             | 0805085   | SK 5,08/3,8:SO             |
| Marker pen, for manual labeling of unprinted Zack strips, smear-proof and waterproof, line thickness 0.5 mm | 1051993   | B-STIFT                    |
|                                                                                                             | 1719118   | TVMSTB 2,5/ 4-STF-5,08     |
|                                                                                                             | 1754814   | FKCN 2,5/ 4-STF-5,08       |
|                                                                                                             | 1777824   | FRONT-MSTB 2,5/ 4-STF-5,08 |
|                                                                                                             | 1778001   | MSTB 2,5/ 4-STF-5,08       |
|                                                                                                             | 1805327   | MSTBT 2,5/ 4-STF-5,08      |
|                                                                                                             | 1809750   | MSTBC 2,5/ 4-STZF-5,08     |
|                                                                                                             | 1834929   | MVSTBW 2,5/ 4-STF-5,08     |
|                                                                                                             | 1835119   | MVSTBR 2,5/ 4-STF-5,08     |

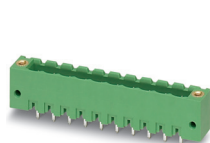
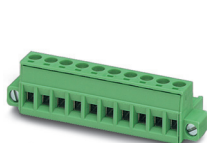
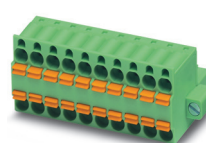


**1777099 MSTBV 2,5/ 4-GF-5,08**

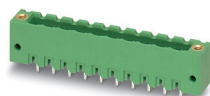
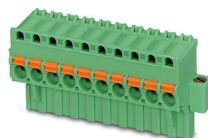
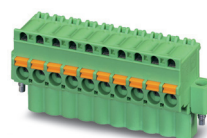
| Description | Order No. | Type                   |
|-------------|-----------|------------------------|
|             | 1853120   | TMSTBP 2,5/ 4-STF-5,08 |
|             | 1873223   | FKC 2,5/ 4-STF-5,08    |
|             | 1873825   | FKCVW 2,5/ 4-STF-5,08  |
|             | 1874125   | FKCVR 2,5/ 4-STF-5,08  |
|             | 1883378   | QC 1/ 4-STF-5,08       |
|             | 1902327   | FKCT 2,5/ 4-STF-5,08   |
|             | 1962710   | TFKC 2,5/ 4-STF-5,08   |
|             | 1971086   | SMSTB 2,5/ 4-STF-5,08  |
|             | 1975286   | FKCS 2,5/ 4-STF-5,08   |

## 1777099 MSTBV 2,5/ 4-GF-5,08

## 20 Combination tests

**MSTBV 2,5/..-GF****MSTB 2,5/..-STF****TVMSTB 2,5/..-STF****TFKC 2,5/..-STF****MVSTBW 2,5/..-STF**

|                                                                                 |                                                                               |                                                                               |                                                                               |                                                                               |
|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| IEC 61984                                                                       | IEC 61984                                                                     | IEC 61984                                                                     | IEC 61984                                                                     | IEC 61984                                                                     |
| <b>Mechanical tests (A)</b>                                                     |                                                                               |                                                                               |                                                                               |                                                                               |
| Insertion/withdrawal force per position                                         | approx. 8 N / 6 N                                                             | approx. 8 N / 6 N                                                             | approx. 10 N / 9.5 N                                                          | approx. 8 N / 6 N                                                             |
| Polarization when inserted<br>Requirement >20 N                                 | Test passed                                                                   | Test passed                                                                   | Test passed                                                                   | Test passed                                                                   |
| Contact holder in insert<br>Requirements >20 N                                  | Test passed                                                                   | Test passed                                                                   | Test passed                                                                   | Test passed                                                                   |
| <b>Durability tests (B)</b>                                                     |                                                                               |                                                                               |                                                                               |                                                                               |
| Contact resistance $R_1$                                                        | 2.5 mΩ                                                                        | 2.3 mΩ                                                                        | 2 mΩ                                                                          | 3.5 mΩ                                                                        |
| Insertion/withdrawal cycles                                                     | 25                                                                            | 25                                                                            | 25                                                                            | 25                                                                            |
| Contact resistance $R_2$                                                        | 2.6 mΩ                                                                        | 2.5 mΩ                                                                        | 2.2 mΩ                                                                        | 3.5 mΩ                                                                        |
| Rated impulse voltage at sea level<br>Voltage waveform $\geq (1.2/50 \mu s)$    | 4.8 kV                                                                        | 4.8 kV                                                                        | 4.8 kV                                                                        | 4.8 kV                                                                        |
| Power-frequency withstand voltage<br>Voltage waveform $\geq (50/60 \text{ Hz})$ | 2.21 kV                                                                       | 2.21 kV                                                                       | 2.21 kV                                                                       | 2.21 kV                                                                       |
| <b>Thermal tests (C)</b>                                                        |                                                                               |                                                                               |                                                                               |                                                                               |
| Tested number of positions                                                      | 20                                                                            | 10                                                                            | 10                                                                            | 20                                                                            |
| Tested conductor cross section                                                  | 2.5 mm <sup>2</sup>                                                           | 2.5 mm <sup>2</sup>                                                           | 2.5 mm <sup>2</sup>                                                           | 2.5 mm <sup>2</sup>                                                           |
| Test current                                                                    | 12 A                                                                          | 12 A DC                                                                       | 12 A                                                                          | 12 A                                                                          |
| Upper limiting temperature<br>Requirements < 100°C                              | Test passed                                                                   | Test passed                                                                   | Test passed                                                                   | Test passed                                                                   |
| <b>Climatic tests (D)</b>                                                       |                                                                               |                                                                               |                                                                               |                                                                               |
| Test sequence 1: low temperature storage                                        | -40 °C/2 h                                                                    | -40 °C/2 h                                                                    | -40 °C/2 h                                                                    | -40 °C/2 h                                                                    |
| Test sequence 2: heat storage                                                   | 100 °C/168 h                                                                  | 100 °C/168 h                                                                  | 100 °C/168 h                                                                  | 100 °C/168 h                                                                  |
| Test sequence 3: noxious gas storage<br>(ISO 6988)                              | 0.2 dm <sup>3</sup> SO <sub>2</sub> on 300 dm <sup>3</sup> /<br>40 °C/1 cycle | 0.2 dm <sup>3</sup> SO <sub>2</sub> on 300 dm <sup>3</sup> /<br>40 °C/1 cycle | 0.2 dm <sup>3</sup> SO <sub>2</sub> on 300 dm <sup>3</sup> /<br>40 °C/1 cycle | 0.2 dm <sup>3</sup> SO <sub>2</sub> on 300 dm <sup>3</sup> /<br>40 °C/1 cycle |
| Rated impulse voltage at sea level<br>Voltage waveform $\geq (1.2/50 \mu s)$    | 4.8 kV                                                                        | 4.8 kV                                                                        | 4.8 kV                                                                        | 4.8 kV                                                                        |
| Power-frequency withstand voltage<br>Voltage waveform $\geq (50/60 \text{ Hz})$ | 2.21 kV                                                                       | 2.21 kV                                                                       | 2.21 kV                                                                       | 2.21 kV                                                                       |
| <b>Environmental and endurance tests (E)</b>                                    |                                                                               |                                                                               |                                                                               |                                                                               |
| Specification                                                                   | IEC 61984:2008-10                                                             | IEC 61984:2008-10                                                             | IEC 61984:2008-10                                                             | IEC 61984:2008-10                                                             |
| Degree of protection                                                            | Finger safety with IP20<br>test finger                                        | Finger safety with IP20<br>test finger                                        | Finger safety with IP20<br>test finger                                        | Finger safety with IP20<br>test finger                                        |

**1777099 MSTBV 2,5/ 4-GF-5,08****MSTBV 2,5/..-GF****SMSTB 2,5/..-STF****FKCVR 2,5/..-STF****FKCVW 2,5/..-STF****FRONT-MSTB 2,5/..-STF**

|                                                                                 |                                                                               |                                                                               |                                                                               |                                                                               |
|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| IEC 61984                                                                       | IEC 61984                                                                     | IEC 61984                                                                     | IEC 61984                                                                     | IEC 61984                                                                     |
| <b>Mechanical tests (A)</b>                                                     |                                                                               |                                                                               |                                                                               |                                                                               |
| Insertion/withdrawal force per position                                         | approx. 8 N / 6 N                                                             | approx. 8 N / 6 N                                                             | approx. 8 N / 6 N                                                             | approx. 8 N / 6 N                                                             |
| Polarization when inserted<br>Requirement >20 N                                 | Test passed                                                                   | Test passed                                                                   | Test passed                                                                   | Test passed                                                                   |
| Contact holder in insert<br>Requirements >20 N                                  | Test passed                                                                   | Test passed                                                                   | Test passed                                                                   | Test passed                                                                   |
| <b>Durability tests (B)</b>                                                     |                                                                               |                                                                               |                                                                               |                                                                               |
| Contact resistance $R_1$                                                        | 3.4 mΩ                                                                        | 2.2 mΩ                                                                        | 2.2 mΩ                                                                        | 2.4 mΩ                                                                        |
| Insertion/withdrawal cycles                                                     | 25                                                                            | 25                                                                            | 25                                                                            | 25                                                                            |
| Contact resistance $R_2$                                                        | 3.5 mΩ                                                                        | 2.3 mΩ                                                                        | 2.3 mΩ                                                                        | 2.6 mΩ                                                                        |
| Rated impulse voltage at sea level<br>Voltage waveform $\geq (1.2/50 \mu s)$    | 4.8 kV                                                                        | 4.8 kV                                                                        | 4.8 kV                                                                        | 4.8 kV                                                                        |
| Power-frequency withstand voltage<br>Voltage waveform $\geq (50/60 \text{ Hz})$ | 2.21 kV                                                                       | 2.21 kV                                                                       | 2.21 kV                                                                       | 2.21 kV                                                                       |
| <b>Thermal tests (C)</b>                                                        |                                                                               |                                                                               |                                                                               |                                                                               |
| Tested number of positions                                                      | 24                                                                            | 16                                                                            | 16                                                                            | 20                                                                            |
| Tested conductor cross section                                                  | 2.5 mm <sup>2</sup>                                                           | 2.5 mm <sup>2</sup>                                                           | 2.5 mm <sup>2</sup>                                                           | 2.5 mm <sup>2</sup>                                                           |
| Test current                                                                    | 12 A                                                                          | 12 A                                                                          | 12 A                                                                          | 12 A                                                                          |
| Upper limiting temperature<br>Requirements < 100°C                              | Test passed                                                                   | Test passed                                                                   | Test passed                                                                   | Test passed                                                                   |
| <b>Climatic tests (D)</b>                                                       |                                                                               |                                                                               |                                                                               |                                                                               |
| Test sequence 1: low temperature storage                                        | -40 °C/2 h                                                                    | -40 °C/2 h                                                                    | -40 °C/2 h                                                                    | -40 °C/2 h                                                                    |
| Test sequence 2: heat storage                                                   | 100 °C/168 h                                                                  | 105 °C/168 h                                                                  | 105 °C/168 h                                                                  | 100 °C/168 h                                                                  |
| Test sequence 3: noxious gas storage<br>(ISO 6988)                              | 0.2 dm <sup>3</sup> SO <sub>2</sub> on 300 dm <sup>3</sup> /<br>40 °C/1 cycle | 0.2 dm <sup>3</sup> SO <sub>2</sub> on 300 dm <sup>3</sup> /<br>40 °C/1 cycle | 0.2 dm <sup>3</sup> SO <sub>2</sub> on 300 dm <sup>3</sup> /<br>40 °C/1 cycle | 0.2 dm <sup>3</sup> SO <sub>2</sub> on 300 dm <sup>3</sup> /<br>40 °C/1 cycle |
| Rated impulse voltage at sea level<br>Voltage waveform $\geq (1.2/50 \mu s)$    | 4.8 kV                                                                        | 4.8 kV                                                                        | 4.8 kV                                                                        | 4.8 kV                                                                        |
| Power-frequency withstand voltage<br>Voltage waveform $\geq (50/60 \text{ Hz})$ | 2.21 kV                                                                       | 2.21 kV                                                                       | 2.21 kV                                                                       | 2.21 kV                                                                       |
| <b>Environmental and endurance tests (E)</b>                                    |                                                                               |                                                                               |                                                                               |                                                                               |
| Specification                                                                   | IEC 61984:2008-10                                                             | IEC 61984:2008-10                                                             | IEC 61984:2008-10                                                             | IEC 61984:2008-10                                                             |
| Degree of protection                                                            | Finger safety with IP20<br>test finger                                        | Finger safety with IP20<br>test finger                                        | Finger safety with IP20<br>test finger                                        | Finger safety with IP20<br>test finger                                        |