Common Mode Filters

For ultra high-speed differential signal line (HDMI, DVI, DisplayPort, USB3.0, etc.)

TCE series

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCE0806G</td>
<td>[0302 inch]*</td>
</tr>
<tr>
<td>TCE0806S</td>
<td>[0302 inch]</td>
</tr>
<tr>
<td>TCE1210G</td>
<td>[0504 inch]</td>
</tr>
<tr>
<td>TCE1608G</td>
<td>[0603 inch]</td>
</tr>
</tbody>
</table>

* Dimensions Code [EIA]

Issue date: March 2013

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Common Mode Filters
For Ultra High-speed Differential Signal Line
(HDMI, DVI, DisplayPort, USB3.0, etc.)

TCE Series  TCE0806G

FEATURES
• Common mode filter for improving EMC with an ESD protection element (ESD suppressor) using thin-film processing and ma-
terials technology acquired from HDD head manufacturing.
• One component can be used for suppressing common mode noise and ESD.
• Greatly reduces the number of components and installation area.
• By providing wide bandwidth (cutoff frequency: 3GHz min.) for differential mode, this product has almost no effect for high-
speed differential signals and can suppress the radiated emission.
• This product contains no lead and supports lead-free soldering.

APPLICATIONS
Suppressing noise and ESD for high-speed differential signal inter-
faces such as USB 2.0 and HDMI for mobile devices such as mobile phones, smartphones, digital cameras, and portable music players, and general consumer products.

PRODUCT IDENTIFICATION

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCE</td>
<td>0806</td>
<td>G</td>
<td>900</td>
<td>2P</td>
<td>T</td>
</tr>
</tbody>
</table>

(1) Series name
(2) Dimensions LxW
(3) Product identification number
(4) Impedance[at 100MHz]
900: 90Ω
(5) Number of line
2P: 2-line
(6) Packaging style
T: ø180mm reel taping

TEMPERATURE RANGES

<table>
<thead>
<tr>
<th></th>
<th>Operating</th>
<th>Storage(After mount)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>–25 to +85°C</td>
<td>–25 to +85°C</td>
</tr>
</tbody>
</table>

PACKAGING STYLE AND QUANTITIES

<table>
<thead>
<tr>
<th>Packaging style</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taping</td>
<td>10,000 pieces/reel</td>
</tr>
</tbody>
</table>

SHAPE AND DIMENSIONS/CIRCUIT DIAGRAMS/RECOMMENDED PC BOARD PATTERNS

Dimensions in mm

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### ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Common mode impedance (Ω) [100MHz]</th>
<th>DC resistance (Ω) max. [1 line]</th>
<th>Cutoff frequency (GHz) typ.</th>
<th>Clamp voltage (V) max.</th>
<th>Rated current Idc (A) max.</th>
<th>Rated voltage Edc (V) max.</th>
<th>Insulation resistance (MΩ) min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCE0806G-900-2P</td>
<td>90±30</td>
<td>3.5</td>
<td>5.0</td>
<td>100</td>
<td>0.10</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

**TYPICAL ELECTRICAL CHARACTERISTICS**

**IMPEDANCE vs. FREQUENCY CHARACTERISTICS**

![Impedance vs. Frequency Graph](image-url)
Common Mode Filters
For Ultra High-speed Differential Signal Line
(HDMI, DVI, DisplayPort, USB3.0, etc.)

TCE Series  TCE0806S

FEATURES
- Common mode filter for improving EMC with an ESD protection element (ESD suppressor) using thin-film processing and materials technology acquired from HDD head manufacturing.
- One component can be used for suppressing common mode noise and ESD.
- Greatly reduces the number of components and installation area.
- By providing wide bandwidth (cutoff frequency: 3GHz min.) for differential mode, this product has almost no effect for high-speed differential signals and can suppress the radiated emission.
- This product contains no lead and supports lead-free soldering.

APPLICATIONS
Suppressing noise and ESD for high-speed differential signal interfaces such as USB3.0, HDMI and Serial ATA for mobile devices such as mobile phones, smartphones, digital cameras, and portable music players, and general consumer products.

PRODUCT IDENTIFICATION
<table>
<thead>
<tr>
<th>(1) Series name</th>
<th>(2) Dimensions L-W</th>
<th>(3) Product identification number</th>
<th>(4) Impedance[at 100MHz]</th>
<th>(5) Number of line</th>
<th>(6) Packaging style</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCE</td>
<td>0806</td>
<td>S</td>
<td>120</td>
<td>2P</td>
<td>T</td>
</tr>
</tbody>
</table>

(1) Series name
(2) Dimensions L-W
(3) Product identification number
(4) Impedance[at 100MHz] 120: 12Ω
(5) Number of line 2P: 2-line
(6) Packaging style T: ø180mm reel taping

TEMPERATURE RANGES
<table>
<thead>
<tr>
<th>Packing style</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taping</td>
<td>10,000 pieces/reel</td>
</tr>
</tbody>
</table>

SHAPES AND DIMENSIONS/CIRCUIT DIAGRAMS/RECOMMENDED PC BOARD PATTERNS

Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

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### ELECTRICAL CHARACTERISTICS

#### TYPICAL ELECTRICAL CHARACTERISTICS

**TCE0806S-500-2P-T200**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Common mode impedance ($\Omega$) [100MHz]</th>
<th>DC resistance ($\Omega$)max. [1 line]</th>
<th>Cutoff frequency (GHz)typ.</th>
<th>Clamp voltage (V)max.</th>
<th>Rated current $I_{dc}$ (A)max.</th>
<th>Rated voltage $E_{dc}$ (V)max.</th>
<th>Insulation resistance (M$\Omega$)min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCE0806S-500-2P</td>
<td>50±15</td>
<td>2.5</td>
<td>6.5</td>
<td>100</td>
<td>0.10</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>TCE0806S-350-2P</td>
<td>35±12</td>
<td>1.8</td>
<td>7.0</td>
<td>100</td>
<td>0.10</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>TCE0806S-120-2P</td>
<td>12±7</td>
<td>1.0</td>
<td>8.0</td>
<td>100</td>
<td>0.10</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

---

#### IMPEDANCE vs. FREQUENCY CHARACTERISTICS

**TCE0806S-500-2P-T200**

![Impedance vs. Frequency Graph](image1.png)

**TCE0806S-350-2P-T200**

![Impedance vs. Frequency Graph](image2.png)

**TCE0806S-120-2P-T200**

![Impedance vs. Frequency Graph](image3.png)

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Common Mode Filters
For Ultra High-speed Differential Signal Line
(HDMI, DVI, DisplayPort, USB3.0, etc.)

TCE Series  TCE1210G

FEATURES

- Common mode filter for improving EMC with an ESD protection element (ESD suppressor) using thin-film processing and materials technology acquired from HDD head manufacturing.
- One component can be used for suppressing common mode noise and ESD.
- Greatly reduces the number of components and installation area.
- By providing wide bandwidth (cutoff frequency: 3GHz min.) for differential mode, this product has almost no effect for high-speed differential signals and can suppress the radiated emission.
- This product contains no lead and supports lead-free soldering.

APPLICATIONS

Suppressing noise and ESD for high-speed differential signal interfaces such as USB 2.0 and HDMI for mobile devices such as mobile phones, smartphones, digital cameras, and portable music players, and general consumer products.

PRODUCT IDENTIFICATION

<table>
<thead>
<tr>
<th>(1) Series name</th>
<th>TCE</th>
<th>(2) Dimensions L-W</th>
<th>G</th>
<th>(3) Product identification number</th>
<th>900</th>
<th>(4) - 2P</th>
<th>(5)</th>
<th>T</th>
</tr>
</thead>
</table>

(1) Series name
(2) Dimensions L-W
(3) Product identification number
(4) Impedance [at 100MHz]
900: 90Ω
(5) Number of line
2P: 2-line
(6) Packaging style
T: ø180mm reel taping

TEMPERATURE RANGES

<table>
<thead>
<tr>
<th>Packaging style</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taping</td>
<td>4000 pieces/reel</td>
</tr>
</tbody>
</table>

packaging style quantity

OE 1210 G - 900 - 2P - T

(1) (2) (3) (4) (5) (6)

Dimensions in mm

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## ELECTRICAL CHARACTERISTICS

### TYPICAL ELECTRICAL CHARACTERISTICS

#### IMPEDANCE vs. FREQUENCY CHARACTERISTICS

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Common mode impedance (Ω) [100MHz] min.</th>
<th>DC resistance (Ω)max.</th>
<th>Cutoff frequency (GHz)typ.</th>
<th>Clamp voltage (V)max.</th>
<th>Rated current (A)max.</th>
<th>Rated voltage (V)max.</th>
<th>Insulation resistance (MΩ)min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCE1210G-900-2P</td>
<td>60</td>
<td>90</td>
<td>1.75</td>
<td>5.0</td>
<td>100</td>
<td>0.10</td>
<td>10</td>
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**Impedance (Ω) vs. Frequency (MHz)**

- Common mode
- Differential mode

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Common Mode Filters
For Ultra High-speed Differential Signal Line
(HDMI, DVI, DisplayPort, USB3.0, etc.)

TCE Series  TCE1608G

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</thead>
<tbody>
<tr>
<td>TCE</td>
<td>1608</td>
<td>G - 900 - 4P - T</td>
<td>90Ω</td>
<td>4P: 4-line</td>
<td>T: ø180mm reel taping</td>
</tr>
</tbody>
</table>

TEMPERATURE RANGES
Operating: –25 to +85°C
Storage(After mount): –25 to +85°C

PACKAGING STYLE AND QUANTITIES
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#### TYPICAL ELECTRICAL CHARACTERISTICS

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<tbody>
<tr>
<td>Frequency (MHz)</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>100</td>
</tr>
<tr>
<td>1000</td>
</tr>
<tr>
<td>10000</td>
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#### IMPEDANCE vs. FREQUENCY CHARACTERISTICS

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<th>Clamp voltage (V)max.</th>
<th>Rated current Idc (A)max.</th>
<th>Rated voltage Edc (V)max.</th>
<th>Insulation resistance (MΩ)min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCE1608G-900-4P</td>
<td>60 90 1.95 5.0 100 0.10 10 1</td>
<td>50 20 10 2 50 0.5 10 5</td>
<td>1000 100 10 1 1000 100 10 1</td>
<td>1000 100 10 1 1000 100 10 1</td>
<td>1000 100 10 1 1000 100 10 1</td>
<td>1000 100 10 1 1000 100 10 1</td>
<td>1000 100 10 1 1000 100 10 1</td>
</tr>
</tbody>
</table>

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