

## Common Mode Filters

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

### TCE series

Type:	TCE1210	[0504 inch]*
	TCE1210U	[0504 inch]
	TCE1608	[0603 inch]
		* Dimensions Code [EIA]

Issue date: September 2011

- All specifications are subject to change without notice.
  - 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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# Common Mode Filters

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

Conformity to RoHS Directive

### TCE Series TCE1210

#### FEATURES

- Common mode filter for improving EMC with an ESD protection element (ESD suppressor) using thin-film processing and material 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, USB3.0 and HDMI for mobile devices such as mobile phones, smartphones, digital cameras, and portable music players, and general consumer products.

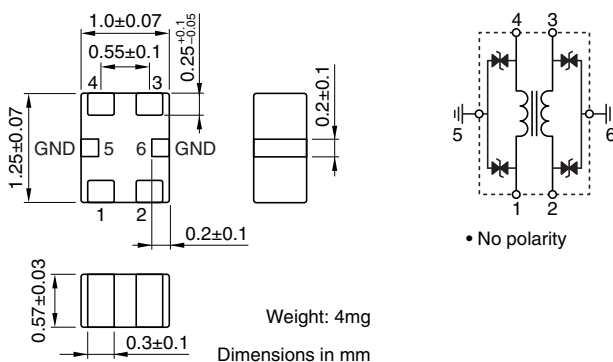
#### TEMPERATURE RANGES

Operating	-25 to +85°C
Storage(After mount)	-25 to +85°C

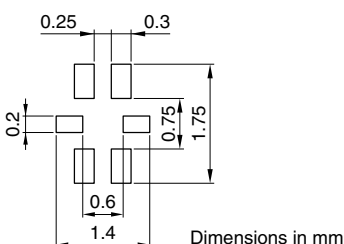
#### PACKAGING STYLE AND QUANTITIES

Packaging style	Quantity
Taping	4000 pieces/reel

#### SHAPES AND DIMENSIONS/CIRCUIT DIAGRAMS



#### RECOMMENDED PC BOARD PATTERNS



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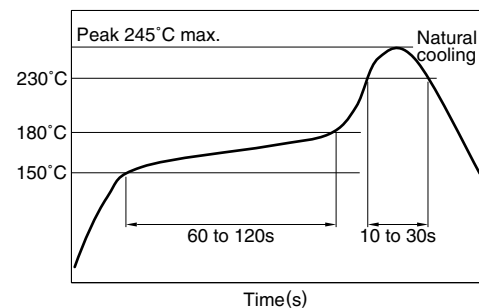
#### PRODUCT IDENTIFICATION

TCE	1210	-	900	-	2P	-	T
(1)	(2)		(3)		(4)		(5)

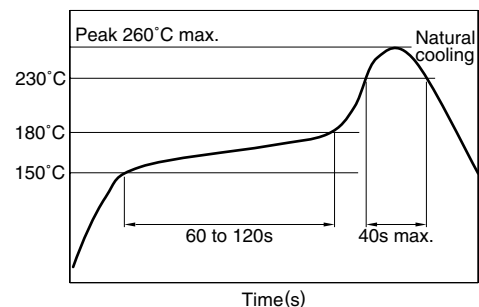
- (1) Series name
- (2) Dimensions L×W
- (3) Impedance[at 100MHz]  
900: 90Ω
- (4) Number of line  
2P: 2-line
- (5) Packaging style  
T: ø180mm reel taping

#### RECOMMENDED SOLDERING CONDITIONS

#### RECOMMENDED TEMPERATURE PROFILE FOR LEAD-FREE SOLDER



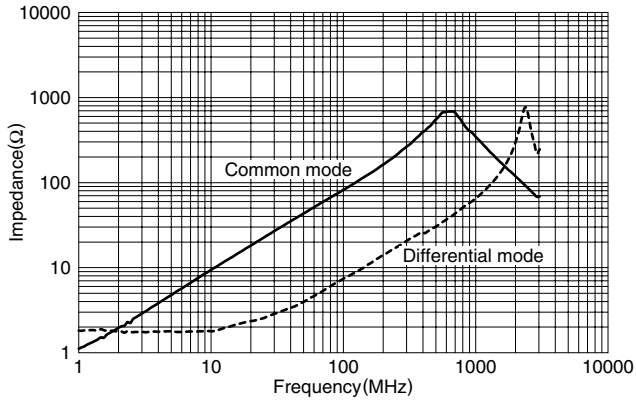
#### REFLOW PROFILE FOR SOLDER HEAT RESISTANCE



### ELECTRICAL CHARACTERISTICS

Part No.	Common mode impedance ( $\Omega$ ) [100MHz]		DC resistance ( $\Omega$ )max. [1 line]	Cutoff frequency (GHz)typ.	Clamp voltage (V)max.	Rated current I <sub>dc</sub> (A)max.	Rated voltage E <sub>dc</sub> (V)max.	Insulation resistance (M $\Omega$ )min.
	min.	typ.						
TCE1210-900-2P	60	90	1.75	5.0	100	0.1	10	1

### TYPICAL ELECTRICAL CHARACTERISTICS IMPEDANCE vs. FREQUENCY CHARACTERISTICS



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

Conformity to RoHS Directive

## TCE Series TCE1210U

### FEATURES

- Common mode filter for improving EMC with an ESD protection element (ESD suppressor) using thin-film processing and material 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 3.0, HDMI, and Serial ATA for mobile devices such as mobile phones, smartphones, digital cameras, and portable music players, and general consumer products.

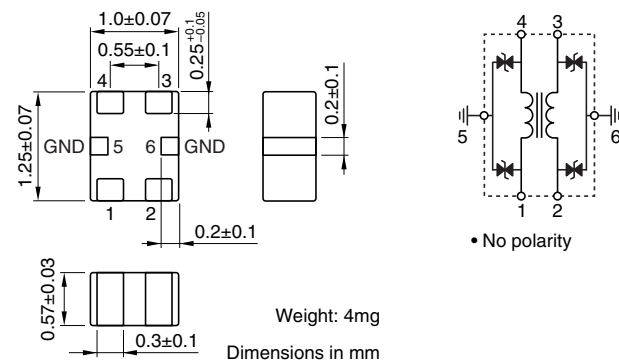
### TEMPERATURE RANGES

Operating	-25 to +85°C
Storage(After mount)	-25 to +85°C

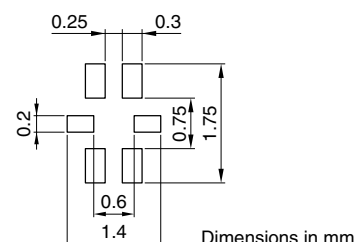
### PACKAGING STYLE AND QUANTITIES

Packaging style	Quantity
Taping	4000 pieces/reel

### 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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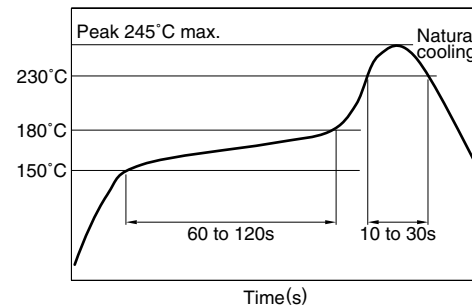
### PRODUCT IDENTIFICATION

TCE	1210	□	-	500	-	2P	-	T
(1)	(2)	(3)	(4)	(5)	(6)			

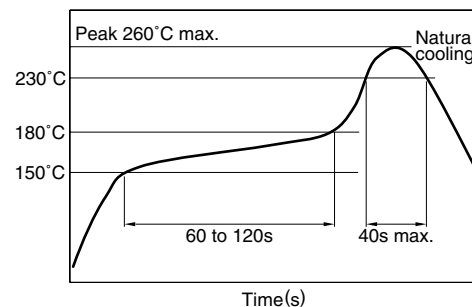
- (1) Series name
- (2) Dimensions L×W
- (3) Product identification number
- (4) Impedance[at 100MHz]  
500: 50Ω
- (5) Number of line  
2P: 2-line
- (6) Packaging style  
T: ø180mm reel taping

### RECOMMENDED SOLDERING CONDITIONS

### RECOMMENDED TEMPERATURE PROFILE FOR LEAD-FREE SOLDER



### REFLOW PROFILE FOR SOLDER HEAT RESISTANCE

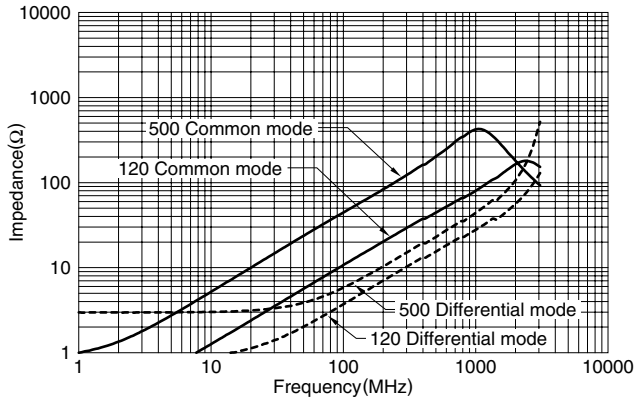


## ELECTRICAL CHARACTERISTICS

Part No.	Common mode impedance ( $\Omega$ ) [100MHz]	DC resistance ( $\Omega$ )max. [1 line]	Cutoff frequency (GHz)typ.	Clamp voltage (V)max.	Rated current Idc (A)max.	Rated voltage Edc (V)max.	Insulation resistance (M $\Omega$ )min.
TCE1210U-500-2P	50 $\pm$ 20	1.7	6.5	100	0.1	10	1
TCE1210U-120-2P	12 $\pm$ 5	0.7	8.0	120	0.1	10	1

## TYPICAL ELECTRICAL CHARACTERISTICS

### IMPEDANCE vs. FREQUENCY CHARACTERISTICS



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

Conformity to RoHS Directive

## TCE Series TCE1608

### FEATURES

- Common mode filter for improving EMC with an ESD protection element (ESD Suppressor) using thin-film processing and material 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 3.0, HDMI, and Serial ATA for mobile devices such as mobile phones, smartphones, digital cameras, and portable music players, and general consumer products.

### TEMPERATURE RANGES

Operating	-25 to +85°C
Storage(After mount)	-25 to +85°C

### PACKAGING STYLE AND QUANTITIES

Packaging style	Quantity
Taping	4000 pieces/reel

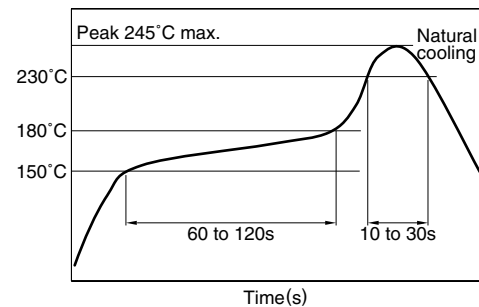
### PRODUCT IDENTIFICATION

TCE 1608 - 900 - 4P - T  
(1) (2) (3) (4) (5)

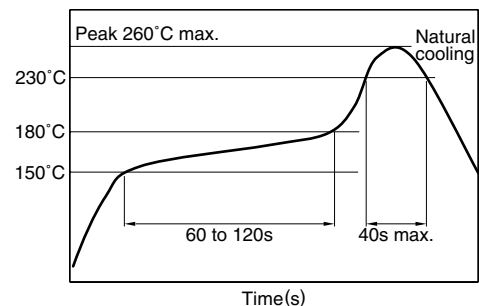
- (1) Series name
- (2) Dimensions L×W
- (3) Impedance[at 100MHz]  
900: 90Ω
- (4) Number of line  
4P: 4-line
- (5) Packaging style  
T: ø180mm reel taping

### RECOMMENDED SOLDERING CONDITIONS

#### RECOMMENDED TEMPERATURE PROFILE FOR LEAD-FREE SOLDER



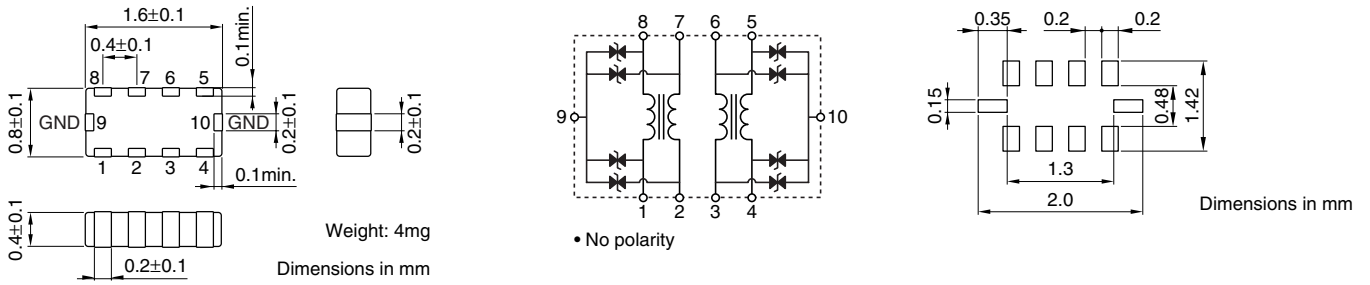
#### REFLOW PROFILE FOR SOLDER HEAT RESISTANCE



• 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.

• All specifications are subject to change without notice.

## SHAPES AND DIMENSIONS/CIRCUIT DIAGRAMS/RECOMMENDED PC BOARD PATTERNS



## ELECTRICAL CHARACTERISTICS

Part No.	Common mode impedance ( $\Omega$ ) [100MHz]		DC resistance ( $\Omega$ )max. [1 line]	Cutoff frequency (GHz)typ.	Clamp voltage (V)max.	Rated current $I_{dc}$ (A)max.	Rated voltage $E_{dc}$ (V)max.	Insulation resistance ( $M\Omega$ )min.
	min.	typ.						
TCE1608-900-4P	60	90	1.95	5.0	100	0.1	10	1

## TYPICAL ELECTRICAL CHARACTERISTICS

### IMPEDANCE vs. FREQUENCY CHARACTERISTICS

