# SPECIFICATION

SPEC. No.

D A T E : 2013 Feb.

To

Non-Controlled Copy

| CUSTOMER'S PRODUCT NAME | TDK'S PRODUCT NAME |
|---|---|
| | FERRITE CHIP COMMON MODE FILTER<br>LGJ45B SERIES – HIGH RELIABILITY GRADE<br>- See section 1 on page 1 for Important Product Information |

**ALL ORDERS FOR THIS PRODUCT ARE SUBJECT TO THE TERMS AND CONDITIONS OF THIS SPECIFICATION**

DATE: YEAR MONTH DAY

TDK Corporation
Sales
Electronic Components
Sales & Marketing Group

TDK-EPC Corporation
Engineering
Magnetics Business Group

| APPROVED | Person in Charge |
|---|---|
| | |

| APPROVED | CHECKED | Person in Charge |
|---|---|---|
| | | |

## 1. SCOPE AND MEANING OF 'HIGH RELIABILITY GRADE"

This specification is applicable to FERRITE CHIP COMMON MODE FILTERS with a priority over the other relevant specifications. Manufacturing places defined in this specification shall be TDK-EPC Corporation Japan, and TDK Components USA. Inc.

"High Reliability Grade" means that TDK's LGJ Series Inductors provide an extended life Inductor that meets or exceeds the electrical, mechanical and environmental performance standards from AEC Q200 Rev.D. Details are referenced within section 8 of this specification. It also means that, in addition to our highest quality Inductor, the customer will also receive access to an on-line Sigma Report (Enhanced Certificate of Compliance) and internet based product authentication for each lot (which includes electrical characterization data, and estimated product life, as well as anti-counterfeit packaging).
Additionally RFID (radio frequency identification) tags are available as an option.

EXPLANATORY NOTE:

For warranty information, please refer to section 15 of this specification.

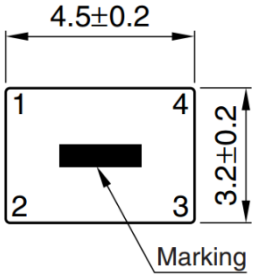
## 2. CODE CONSTRUCTION

(Example)

LGJ45B - 510 - 2P – TL 003
(1) (2) (3) (4) (5)

(1) Series Name
(2) Inductance (typ) 510:51uH
(3) Number of Lines 2P: 2 Lines
(4) Packaging Style TL: Taping ϕ330mm
(5) Control Number

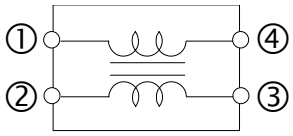
## 3. SHAPES AND DIMENSIONS/CIRCUIT DIAGRAM



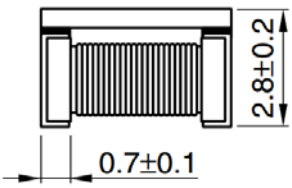

**Marking**
e.g.)G345351
G: Product No.[*1]
3: Year (2013→3, 2020→0) 10 years/cycle
45: Week (CW45→45)
3: A day of week[*2]
51: Lot No.

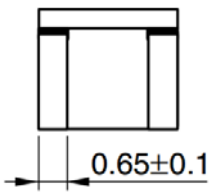
| (*2) Week | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|---|
| Marking | 0 | 1 | 2 | 3 | 4 | 5 | 6 |

**Equivalent Circuit**




No polarity




Dimensions in mm

## 4. ELECTRICAL CHARACTERISTICS

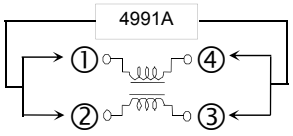
### 4-1. Electrical Specifications

| Customer Part Number | TDK Item Description | Common mode Impedance (Ω) at 10MHz | DC resistance (Ω) max. (1 line) | Rated current DC (mA)max. | Rated voltage DC (V) max. | Insulation Resistance (Ω) min. | Product No. *1 |
|---|---|---|---|---|---|---|---|
| | LGJ45B-110-2P-TL003 | 300min. | 0.6 | 250 | 50 | 10M | E |
| | LGJ45B-220-2P-TL003 | 500min. | 1.0 | 200 | 50 | 10M | F |
| | LGJ45B-510-2P-TL003 | 1000min. | 1.0 | 200 | 50 | 10M | G |
| | LGJ45B-101-2P-TL003 | 2000min. | 2.0 | 150 | 50 | 10M | H |

### 4-2. Test Equipment

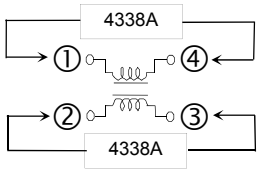
(1) Common Mode Impedance

Measured by using 4991A RF Impedance Analyzer




(2) DC Resistance

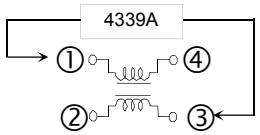
Measured by using 4338A Milli Ohm Meter




(3) Insulation Resistance

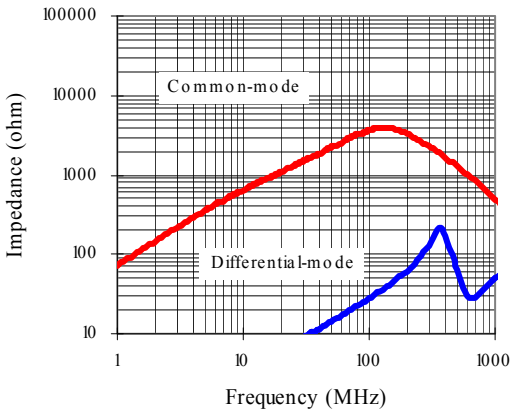
Measured by using 4339A High Resistance Meter

Measurement voltage: 50V; Measurement time: 60sec.

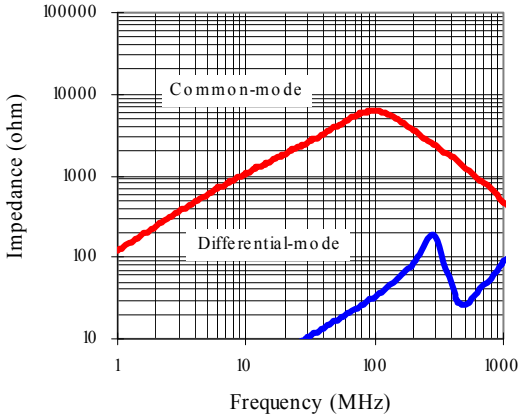


4-3. Frequency vs. Impedance Characteristics (reference)

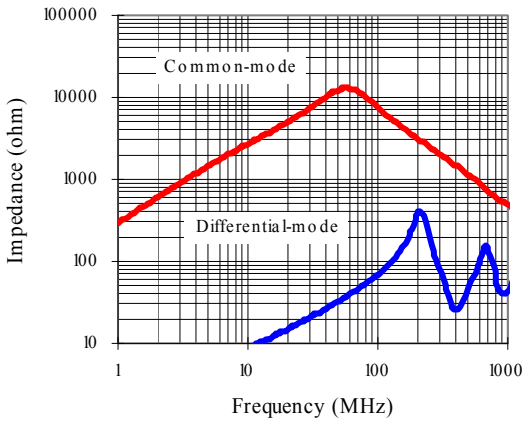
LGJ45B-110-2P



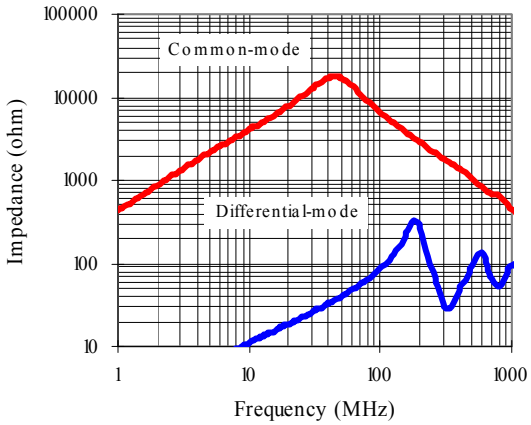

LGJ45B-220-2P




LGJ45B-510-2P




LGJ45B-101-2P




## 5. STORAGE TERMS AND CONDITIONS

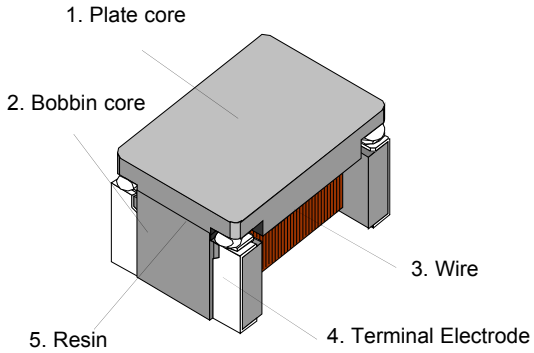
5-1. Storage condition before mounting:
5° C to 40° C at 20 to 70% RH
Use within 12 months from delivery date

5-2. Storage condition after mounting:
-40° C to +150° C

## 6. OPERATING TEMPERATURE RANGE

-40° C to +150° C

## 7. PRODUCT STRUCTURE AND MATERIAL

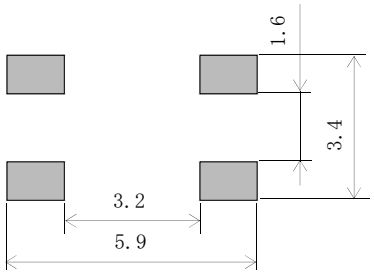



| No. | ITEM NAME | MATERIAL |
|---|---|---|
| 1 | Plate core | Ferrite core |
| 2 | Bobbin core | Ferrite core |
| 3 | Wires | Polyamide imide wire |
| 4 | Terminal Electrode | Phosphor bronze +Ni+ Sn |
| 5 | Resin | Epoxy resin |

## 8. PERFORMANCE

| No. | Item | Performance | Test Condition / Inspection Method |
|---|---|---|---|
| 1 | Solderability | Solder shall successfully connect product to circuit board with minimum 0.2mm fillet height. | Reflow solder the Common Mode Filter on the P.C. test board.<br>Refer to Section 10 for reflow profile. |
| 2 | Resistance to Solder Heat | External Appearance: No mechanical damage.<br>Impedance: Meet the initial specs<br>Insulation resistance: Meet the initial specs<br>DC resistance: Meet the initial specs | Reflow solder (2x) the Common Mode Filter on the P.C. test board.<br>Reflow Profile<br>150~180° C<br>60~120 sec.<br>Peak 260° Cmax.<br>230° C<br>40 sec.max.<br>Reflow two times |
| 3 | Robustness of Termination | External Appearance: No mechanical damage | Reflow solder the Common Mode Filter on the P.C. test board.<br>Apply a lateral pushing force of 9.8N in direction of arrow.<br>Printed circuit board<br>φ1.0 |
| 4 | Low Temperature Exposure (Storage) | External Appearance: No mechanical damage.<br>Impedance: Meet the initial specs<br>Insulation resistance: Meet the initial specs<br>DC resistance: Meet the initial specs | After the samples shall be soldered onto the test circuit board, the test shall be done.<br>Measurement : After placing for 24 hours min.<br>Temperature : -40±2° C<br>Testing time : 2000±12 hours |
| 5 | Operational Life | External Appearance: No mechanical damage.<br>Impedance: Meet the initial specs. initial specs<br>Insulation resistance: Meet the initial specs<br>DC resistance: Meet the initial specs | After the samples shall be soldered onto the test circuit board, the test shall be done.<br>Measurement : After placing for 24 hours min.<br>Temperature : 150±2° C<br>Applied current: Rated current<br>Testing time : 2000±12 hours |
| 6 | Bending | External Appearance: No mechanical damage | Solder a chip to test substrate and then apply a load.<br>10 20<br>R10<br>2<br>45 45<br>Test board: FR4 100×40×1mm<br>Fall speed: 1mm/sec.<br>Dimensions in mm |
| 7 | Vibration | External Appearance: No mechanical damage<br>Impedance: Meet the initial specs.<br>Insulation resistance: Meet the initial specs.<br>DC resistance: Meet the initial specs. | After the samples shall be soldered onto the test circuit board, the test shall be done.<br>Frequency : 10~2000Hz<br>Amplitude : 10G or 1.5mm P-P<br>Dimension and times : X, Y and Z directions for 20 minutes, 12 cycles |
| 8 | Thermal Shock | External Appearance: No mechanical damage<br>Impedance : Meet the initial specs.<br>Insulation resistance: Meet the initial specs.<br>DC resistance: Meet the initial specs. | 1 cycle<br>30min.<br>+150° C<br>3min.<br>- 40° C<br>30min.<br>Test Time: 2,000 cycle |
| 9 | Biased Humidity | External Appearance: No mechanical damage<br>Impedance : Meet the initial specs.<br>Insulation resistance: Meet the initial specs.<br>DC resistance: Meet the initial specs. | After the samples shall be soldered onto the test circuit board, the test shall be done.<br>Measurement : After placing for 24 hours min.<br>Temperature : 85±2° C, Humidity : 83~87%RH<br>Testing time: 2000±12 hours |

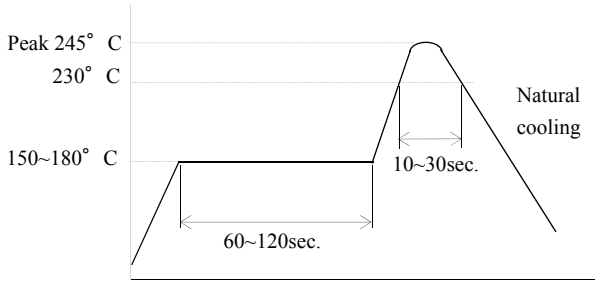
## 9. RECOMMENDED FOOTPRINT



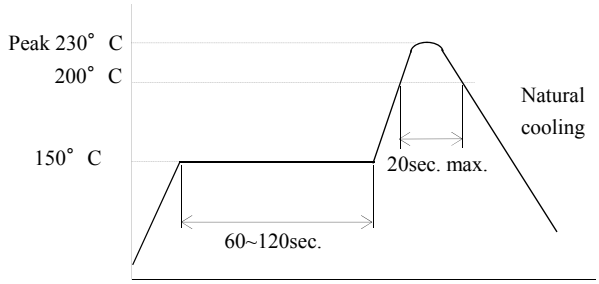

Dimensions in mm

## 10. RECOMMENDED SOLDERING PROFILE (REFLOW ONLY)

10-1. Profile for Pb-Free Solder




10-2. Profile for Sn-Pb Solder




10-3. Iron Soldering

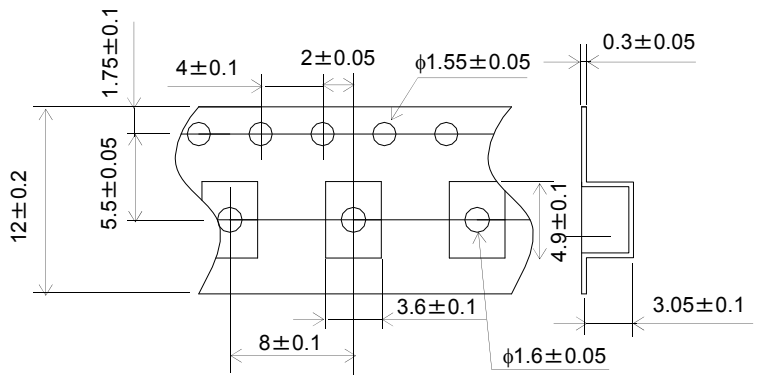
Use a solder iron of less than 30W. When soldering, do not allow the soldering iron tip to directly touch the ferrite body outside of the terminal electrode. 3 seconds max. at 350° C.

## 11. NOTE

1) In case of using this product, please avoid following matters.
   - Splashing water or salt water
   - Dew condenses
   - Toxic gas (Hydrogen sulfide, Sulfurous acid, Chlorine, Ammonia, etc.)
   - Vibrations or shocks which exceed the specified condition
2) Please be careful for the stress to this product by board flexure or something after the mounting
3) This product is only for reflow soldering. (is not available for flow soldering)
4) Please do enough mounting test in case of using.

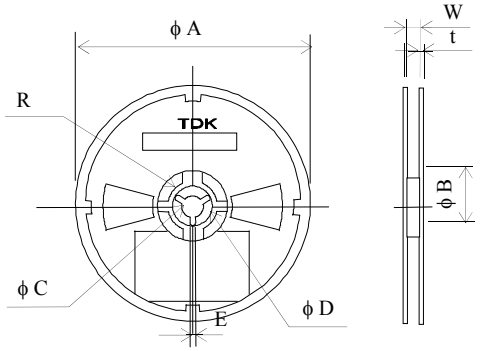
## 12. PACKAGING SPECIFICATION

### 12-1. Dimensions of carrier tape




Dimensions in mm

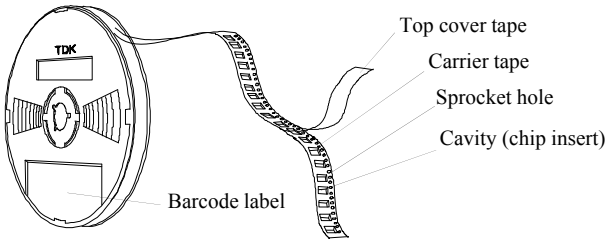
### 12-2. Dimensions of Reel



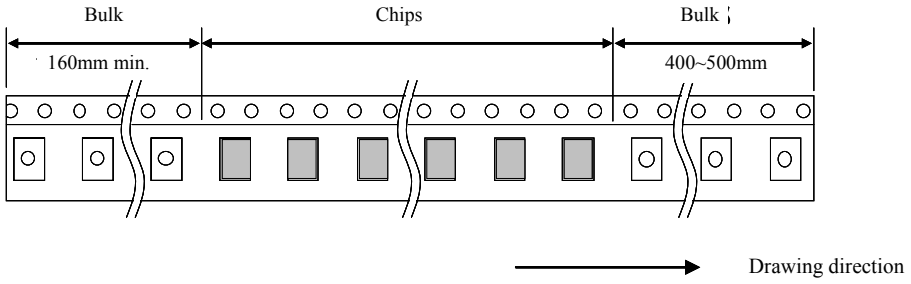

| Symbol | TL(ϕ 330 reel) |
|---|---|
| A | 330±2 |
| B | 100±1 |
| C | 13+0.5/-0.2 |
| D | 21±0.8 |
| E | 2±0.5 |
| W1 | 13.5±0.5 |
| t | 2±0.2 |

12±0.2

### 12-3. Tape and Reel Structure




### 12-4. Bulk part and leader of tape

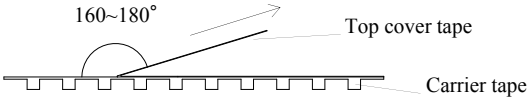



### 12-5. Chip quantity

TL : 2500pcs.(ϕ330 reel)

### 12-6. Cover tape peel strength

The force for tearing off cover tape is 0.1~1.3(N) in the arrow direction at the following conditions.



## 13. PACKAGING LABEL

13-1. Packaging shall be done to protect the components from the damage during transportation and storing, and a label which has the following information shall be attached.

1) Inspection No.
2) TDK P/N
3) Customer's P/N
4) Quantity

*Composition of Inspection No.

Example F 2 A – OO – OOO
(a) (b) (c) (d) (e)

a) Line code
b) Last digit of the year
c) Month and A for January and B for February and so on. (Skip I)
d) Inspection Date of the month.
e) Serial No. of the day


13.2 Anti-counterfeit Label

The anti-counterfeit label with a unique identification code is placed over the reel flanges to ensure material authenticity.
Product authentication can be confirmed by visiting TDK.com and entering the requested information. The secure on-line system will provide an immediate response to the authenticity of the TDK product from the information provided.


DO NOT USE if the seal is broken or evidence of tampering is present.
Contact your local TDK representative for further instructions.

TDK's Optional RFID reel tags are commissioned with lot specific information such as: lot number, customer part number, and quantity. RFID reel tag data can be customized to meet individual customer RFID requirements, as up to 64 bits of data can be stored on the RFID tag. Please contact your TDK sales representative for more information regarding customized information for RFID reel tags.
Below is an example of TDK standard RFID reel tag data (red font indicates data identifiers).

PLGJ45B-101-2P, 1PLGJ45B-101-2P-TL003, Q2500
(customer part no.) (TDK item description) (reel quantity)

TDK's RFID tag is compliant to ISO/IEC 18000-6 :2010 requirements and can be read within the standard operating frequency range for the United States (902-928Mhz) and international regulated frequencies within the Ultra High Frequency (UHF) bandwidth for Europe (865-868Mhz) and Japan (952-957Mhz).

## 14. SIGMA REPORT (ENHANCED CERTIFICATE OF COMPLIANCE)

The Sigma Report, an enhanced Certificate of Compliance will be performed for each lot. The results will be available on-line by visiting TDK.com and entering the requested information.
The Sigma Report will include performance (electrical and mechanical) and reliability metrics (FIT and MTTF).
A list of test completed is provided in Table 14.1.

Table 14.1

| Ref | Test |
|---|---|
| 1 | Appearance |
| 2 | Dimensions |
| 3 | DC Resistance |
| 4 | Solderability |
| 5 | Insulation Resistance |
| 6 | Common Mode Impedance |

## 15. WARRANTY

TDK's LGJ Series Inductors are designed and warranted to meet the performance standards shown in Section 8 (Performance Table) of this specification using the test and inspection methods specified therein.

While LGJ Series Inductors are intended for high reliability applications within the range of conditions set forth in this specification, TDK is not aware of all applications in which these parts may be used, or the requirements of your particular application.

This series is not designed or warranted to meet any specifications of any intermediate or end user different from or in addition to those contained in this specification, nor are they intended or warranted for use in the Excluded Applications below.

Excluded Applications :

- Aerospace/aviation equipment (where the application is related to flight);
- FDA Class III medical equipment (and including any in-the-body medical application or any other medical application where failure of the TDK part could possibly endanger human life or health);
- Nuclear energy-related equipment; and/or
- Military equipment (where related to (1) destructive or explosive functionality including ammunition, firearms, warheads, mines and/or bombs, or (ii) discharging, emitting or blast-off functionality including artillery or missiles, or (iii) military aircraft or spacecraft).

Additionally, if you intend to use TDK's LGJ Series Inductors in any of the applications listed below ("Specialized Applications"), you should carefully review the requirements of the your particular application as against this specification so as to ensure the suitability of these parts for that application. TDK cannot ensure the suitability of these parts for the Specialized Applications below.

Specialized Applications :

- FDA Class I & II medical equipment (with the sale of parts for FDA Class II applications subject to prior TDK consultation).
- Transportation equipment (electric trains, ships, etc.) [other than automotive applications];
- Transportation control equipment;
- Power-generation control equipment;
- Seabed equipment;
- Public information processing equipment;
- Electric heating apparatus and/or burning equipment;
- Disaster/crime prevention equipment; and/or
- Safety equipment.

TDK MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL TDK BE RESPONSIBLE FOR ANY DAMAGE OR LIABILITY CAUSED BY USE OF THESE PARTS IN ANY OF THE EXCLUDED APPLICATIONS LISTED ABOVE OR FOR ANY OTHER USE EXCEEDING THE RANGE OR CONDITIONS SET FORTH IN THIS SPECIFICATION.

Please note that when designing your product, device, or equipment-even for general purpose applications - you should secure a protection circuit/device or provide backup circuits in your product, device, or equipment.

## 16. CAUTIONS

Please read the instructions here before you use this product

# INSTRUCTIONS FOR USING THIS PRODUCT

STORAGE

* Store this product under the conditions which are defined in the catalogue or the instruction book. Confirm the soldering property before using if you have stored the product over the conditions which are defined in the catalogue or the instruction book.
* Do not use or store in locations where there are gas, corrosion (salt, acid alkaline, etc.)
* Avoid the direct rays of the sun and dew condensation.
* Do not expose the product to magnets or magnetic fields.

USING CONDITIONS

* Use this product under the conditions which are defined in the catalogue or the instruction book. Temperature range and soldering property are especially to be noticed.
* This product is designed for public welfare. If you are to use it for other purposes and if it is beyond the conditions in the instruction book , you should make a good examination beforehand.
* Don’t use this product in locations:
  - · Exposed to water or seawater.
  - · With excessive moisture exposure.
  - · Do not use this product in locations where there are gas corrosion (salt, acid, alkaline, etc.)
  - · With vibrations and impulses which are not defined in the instruction book.
* When soldering is touched up after reflow to the PC Board, confirm the conditions which are defined in the catalogue or the instruction book.
* If it is heated excessively , the product may experience conditions such as short circuit , rough contact, lowering of characteristic and shortening of its life.
* Do good washing after soldering and make sure there is no residue left.
* Dry thoroughly after washing.
* Don’t use the product if it is mechanically dropped.
* Pay attention to stresses to the product by bending of the PC Board.