# SPECIFICATION

SPEC. No. C491NAA01306 ISSUE 1
DATE: August 1, 2017

To

Shenzhen Galaxy Supply Chain Co. Ltd.

| CUSTOMER'S PRODUCT NAME | TDK'S PRODUCT NAME |
|---|---|
| | CLF6045T-○○○□-D |

RECEIPT CONFIRMATION

DATE YEAR MONTH DAY

TDK Corporation

Sales
Electronic Components
Sales & Marketing Group

Engineering
TDK Corporation
Electronic Components Business Comoany
Magnetics Business Group
Wire-wound Product B.U.

| APPROVED | Person in charge |
|---|---|
| | |

| APPROVED | CHECKED | Person in charge |
|---|---|---|
| H.Sasaki | M.Masaki | Y.Takanashi |

# CAUTION WHEN HANDLING

Before use the products, please read this specification.

# CAUTION FOR SAFETY USING

When use the products, be careful to mentioned below for safety using.

## ! CAUTION

+ The product should be used within 6 months.
  Be careful to the storage conditions. ( Temperature : 5 to 30deg.C, Humidity : 75%RH Max. )
  Solderability might be decreased if the period is exceeded.
+ Do not use and store the product in condition of gas corrosion (Salt, Acid, Alkaline).
+ The products must be preheated before soldering.
  Difference between preheat and soldering temperature must be within 150deg.C.
+ Rework by soldering iron ; Please keep the mentioned conditions in this specification.
+ In case of insert P.C. Board on chassis, do not add mechanical stress to the product.
+ The product has self heat (temperature rise) by current, so keep margin for heat design.
+ Be careful to arrange of non-magnetic shield type inductors.
  The error may be caused by magnetic field coupling.
+ In case handle the products, please use wrist strap for ground static discharge on human body.
+ The product keeps away from magnet or magnetized things.
+ Do not use the product beyond the mentioned conditions in this specification.
+ About an application
  The products listed on this specification sheet are intended for use in general electronic equipment (AV equipment, telecommunications equipment, home appliances, amusement equipment, computer equipment, personal equipment, office equipment, measurement equipment, industrial robots) under a normal operation and use condition.
  The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property. Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below or for any other use exceeding the range or conditions set forth in this specification sheet.

  1) Aerospace/Aviation equipment
  2) Medical equipment which directly endanger human life
  3) Power-generation control equipment
  4) Atomic energy-related equipment
  5) Seabed equipment
  6) Transportation control equipment
  7) Military equipment
  8) Safety equipment
  9) Other applications that are not considered general-purpose applications

  If you intend to use the products in the following applications, please contact our sales office.
  Transportation equipment (cars, electric trains, ships, etc.) , Public information-processing equipment, Electric heating apparatus / burning equipment , Disaster prevention/crime prevention equipment
  When using this product in general-purpose applications, you are kindly requested to take into consideration securing protection circuit/equipment or providing backup circuits, etc., to ensure higher safety.

1,SCOPE

This specification applies to the high current type SMD inductors for CLF6045T○○○□-D

2,INDEX



9, Standard test conditions

Unless otherwise specified , test condition should be Temp. = 5～35 ℃,

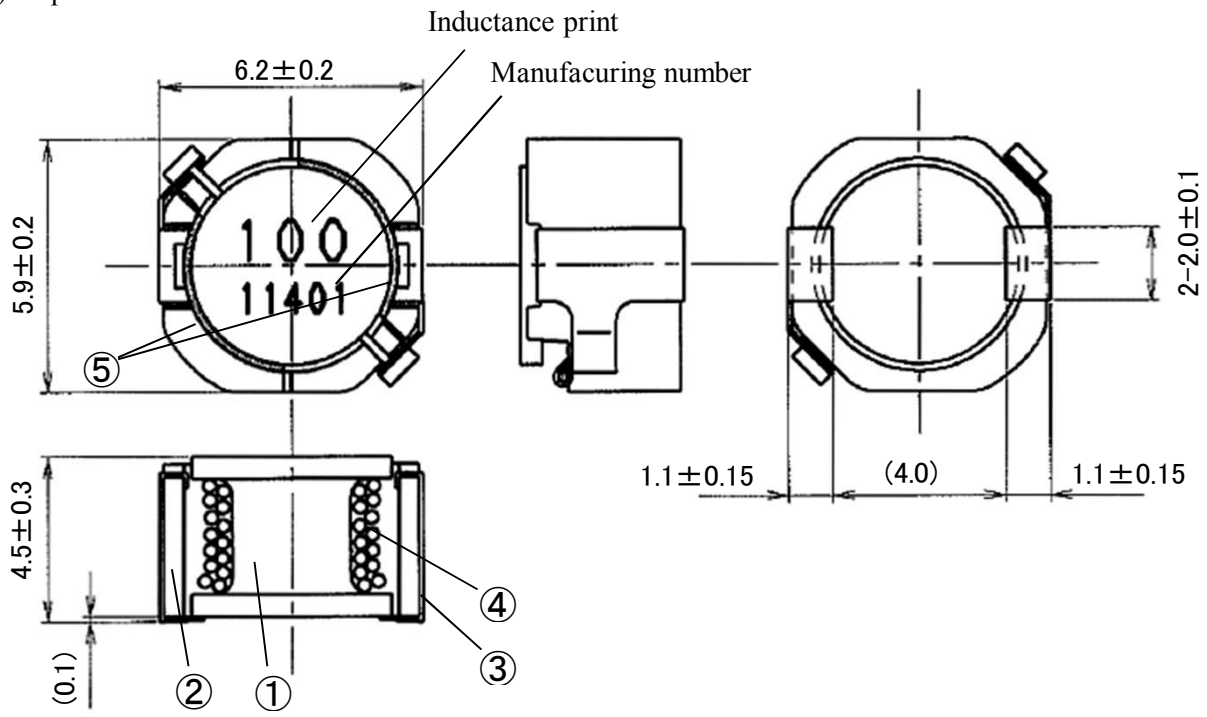
Humidity = 35～85%

But if needed , then test condition should be Temp. = 20±2 ℃, Humidity = 65±5%.

3, Manufacturing Location

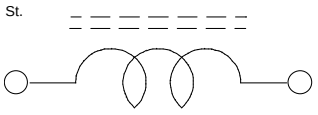
China

(1)Shapes and Dimensions unit : mm




Note: 1) Even if the adhesives of an upper surface application have the portion which has not been buried completely, they presuppose that it is possible.
Note: 2) Values in parentheses are referential.

(2)Electrical Schematics




(3)Characteristics

3-1, Temperature rise : 30℃ TYP.（Itemp)
3-2, Operating Temperature Range : -40℃ to +150℃(Including Self Temperature Rise)
3-3, Storage Temperature Range : -40℃ to +150℃
3-4, Rated current : Please see page 4 (Table 1)
3-5、Application
Reflow soldering can be used for this product while dip-flow can not.
The condition in soldering by hand should confirm to the heat capacitance corresponding to the test of resistance to soldering heat.

| | | |
|---|---|---|
| ⑤ | Glue | Epoxy resin |
| ④ | Winding wire | Polyurethane enameled copper wire |
| ③ | Terminals | Tin plated copper (t0.1) |
| ② | Ring core | Ferrite |
| ① | Drum core | Ferrite |
| No. | Item | Material |

(4)Electrical Specification

Table 1

| Customer P# | TDK P# CLF6045T- | Inductance L(μH) at 100kHz | D.C.Resistance RDC(ohm) | *Rated current(A) | | Inductance print |
|---|---|---|---|---|---|---|
| | | | | Isat TYP. | Itemp TYP. | |
| | 1R0N-D | 1.0±30% | 11m±30% | 5.0 | 4.5 | 1R0 |
| | 1R5N-D | 1.5±30% | 13m±30% | 4.4 | 4.2 | 1R5 |
| | 2R2N-D | 2.2±30% | 15m±30% | 3.9 | 4.0 | 2R2 |
| | 3R3N-D | 3.3±30% | 19m±30% | 3.1 | 3.5 | 3R3 |
| | 4R7N-D | 4.7±30% | 23m±30% | 2.5 | 3.2 | 4R7 |
| | 6R8N-D | 6.8±30% | 27m±30% | 2.2 | 2.9 | 6R8 |
| | 100M-D | 10±20% | 38m±20% | 1.7 | 2.4 | 100 |
| | 150M-D | 15±20% | 55m±20% | 1.5 | 2.0 | 150 |
| | 220M-D | 22±20% | 78m±20% | 1.3 | 1.7 | 220 |
| | 330M-D | 33±20% | 103m±20% | 1.07 | 1.50 | 330 |
| | 470M-D | 47±20% | 130m±20% | 0.90 | 1.30 | 470 |
| | 680M-D | 68±20% | 215m±20% | 0.79 | 1.00 | 680 |
| | 101M-D | 100±20% | 340m±20% | 0.64 | 0.70 | 101 |
| | 151M-D | 150±20% | 480m±20% | 0.50 | 0.60 | 151 |
| | 221M-D | 220±20% | 780m±20% | 0.41 | 0.50 | 221 |
| | 331M-D | 330±20% | 970m±20% | 0.35 | 0.44 | 331 |
| | 471M-D | 470±20% | 1.42±20% | 0.30 | 0.37 | 471 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

*Rated current : the less value which is Isat or Itemp
(Current is D.C.)

Isat : Based on inductance change(△L:-10% from initial L value.)

Itemp : Based on temperature rise(△T:30℃ TYP.)

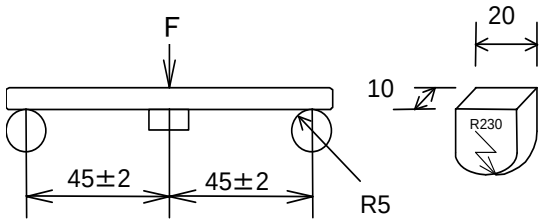
Test Instruments

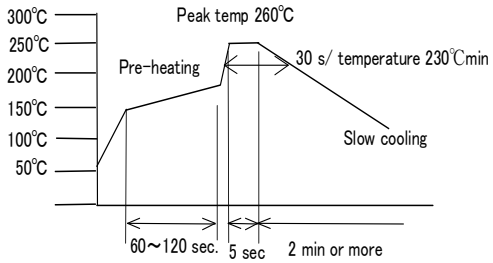
L : 4285A PRECISION LCR METER, HP OR EQUIV.

RDC : MILLIOHM METER VP-2941A, MATSUSHITA OR EQUIV.

L(Isat) : 4285A PRECISION LCR METER, HP with 42841A BIAS CURRENT SOURCE, HP / 42842C TEST FIXTURE, HP OR EQUIV.

(5)Reliability tests

| No. | Test item | Test details | Specification |
|---|---|---|---|
| 1 | Insulation resistance | DC 100V voltage shall be applied for 1 minute between the upsideof the sample and the terminal. | 100M Ohm min. |
| 2 | Dielectric withstanding voltage | AC 100V voltage shall be applied for 1 minute between the upside of the sample and the terminal. (Cut off current : 1mA) | There shall be no break of insulation. |
| 3 | Temperature Characteristics | The test shall be performed after the sample has stabilized in an ambient temperature of -40 to +150℃ . | $\Delta L/L20℃ \leq \pm 20\%$ |
| 4 | Short time over load | 2 times the rated current for 5 minutes. | Their shall be no damage such as smoke or sparks |
| 5 | Substrate bending | The sample shall be soldered onto the printed circuit board and a load applied until the Figure in the arrow direction is made approximately 2mm. (Speed:0.5mm/s) This force is opened up after 3-5 seconds. This is repeated 3 times. For PCB dimensions see page 7.   Figure 1 | $\Delta L/L_0 \leq \pm 5\%$ There shall be no mechanical damage |

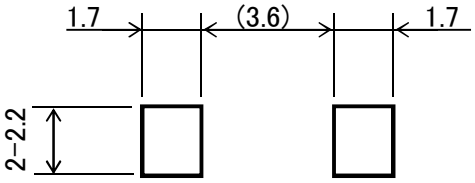
| No. | Test item | Test details | Specification |
|---|---|---|---|
| 6 | Resistance to Soldering heat (reflow soldering) | Temperature profile of reflow soldering<br>Pri-heating:150~180° C 60~120sec.<br>Peak temp. 260±3° C 5sec. or less<br>holding time: 30±5sec.<br>(more than 230℃)<br>  <br><br>*The specimen shall be passed through the reflow oven with the condition shown in the above profile for 2 time.<br>*Test Board : t=1.6mm glass-epoxy type.<br>*Above profiles were measured at the solder paste part.<br>*Solder Paste : M705(Senju Metal Industry). | $\Delta L/L_0 \leq \pm 5\%$<br>There shall be no mechanical damage |
| | Resistance to soldering heat (manual soldering) | Manual soldering<br>Solder Temperature : 400±5℃<br>Dip time : 3+1/-0s | $\Delta L/L_0 \leq \pm 5\%$<br>There shall be no mechanical damage |
| 7 | Solderability | Flux : Rosin, isopropyl alcohol<br>Solder : M705(Senju metal industry)<br>Temperature: 245±2℃<br>Dip time : 3±0.2s | New solder more than more than 90% |
| 8 | Low temperature storage | The sample will be left for 1000±4 hours in an atmosphere with a temperature of -40±3°C.<br>Upon completion of the test the measurement shall be made after the sample has been left in a normal temperature and normal humidity for 1hour. | $\Delta L/L_0 \leq \pm 5\%$<br>There shall be no mechanical damage |
| 9 | High temperature storage | The sample shall be left for 1000±4 hours in an atmospere with a temperaure of 150±2°C and a normal humidity. Upon completion of the measurement shall be made after the sample has been left in normal temperature and normal humidity for 1 hour. | $\Delta L/L_0 \leq \pm 5\%$<br>There shall be no mechanical damage |
| 10 | Moisuture storage | The sample shall be left for 1000±4 hours in a temperatureof +85±2℃ and a humidity (RH) of 85%.<br>Upon completion of the test, the measurement shall be made after the sample has been left in a normal temperature and normal humidity more than 1 hour. | $\Delta L/L_0 \leq \pm 5\%$<br>There shall be no mechanical damage |
| 11 | Change of temperature | The sample shall be subject to 1000 cycles , such as shown in the Table 2 below and then it shall be subjected to standard atmospheric conditions for 1 hour , after which measurement shall be made.<br>Table 2<br>\| \| Temperature \| Duration \|<br>\|---\|---\|---\|<br>\| 1 \| -40℃ \| 30min. \|<br>\| \| ⇳ \| \|<br>\| 2 \| +150℃ \| 30min. \| | $\Delta L/L_0 \leq \pm 5\%$<br>There shall be no mechanical damage |

| No. | Test item | Test details | Specification |
|---|---|---|---|
| 12 | Vibration | Vibration frequency : 10Hz to 500Hz<br>Acceleration or double amplitude : 100m/s$^2$ or 1.5mm P-P<br>Test time : X,Y,Z 2h each axis, total 6h | $\Delta L/L_0 \leq \pm 5\%$<br>There shall be<br>no mechanical<br>damage |
| 13 | Shock | Acceleration : 1000m/s$^2$<br>Duration : 6ms (Half sine pulse)<br>Direction and Number of time : X,Y,Z,X',Y',Z' each 3 times<br>Total 18 times | $\Delta L/L_0 \leq \pm 5\%$<br>There shall be<br>no mechanical<br>damage |

(6)Land dimension

6-1, Land pattern dimension(ref.)

unit : mm



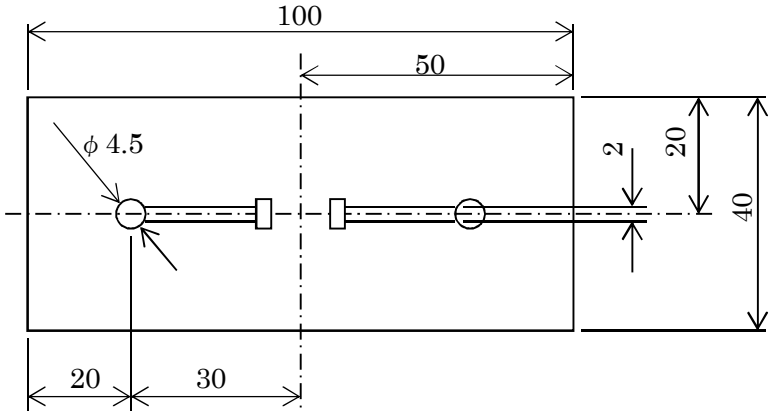

Neighboring copper parts, for example the lines from land, be land, be treated with resist.

6-2, Test PCB dimensions

Substrate Bending Test Board

Glass epoxy t=1.6mm

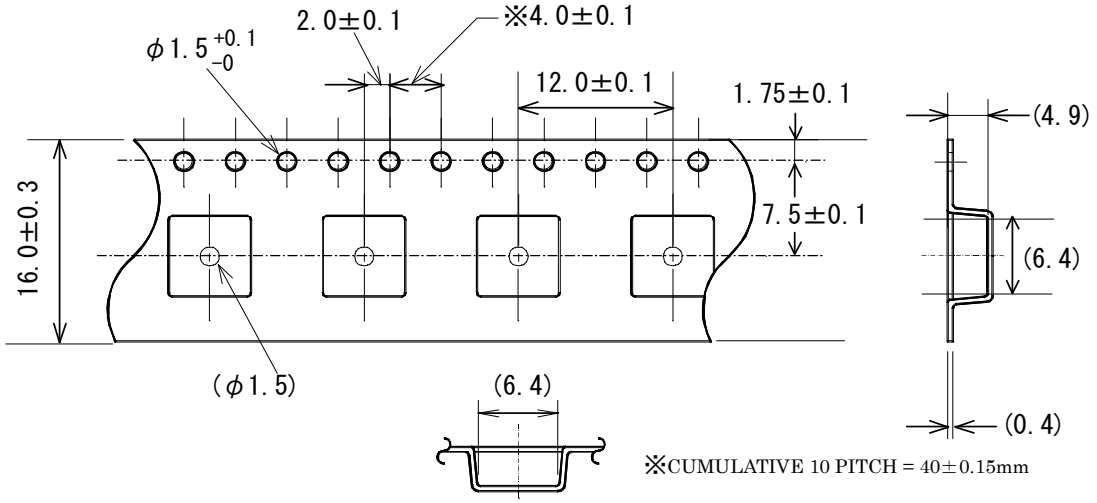
unit : mm



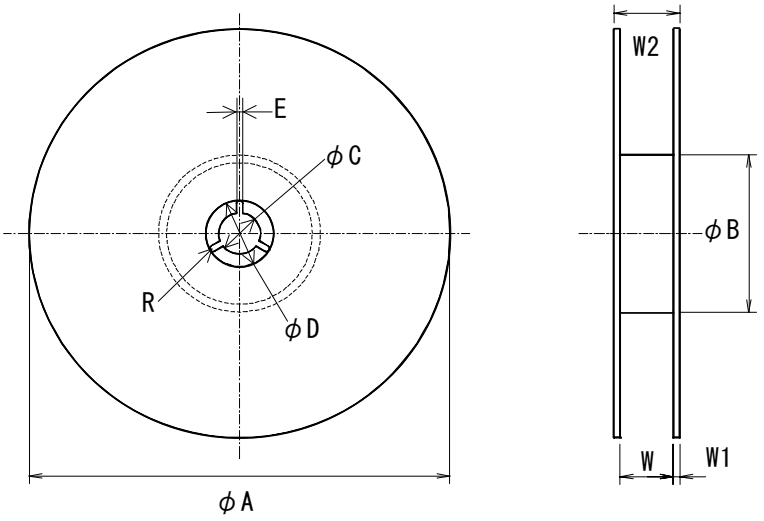
(7) Packaging

7-1, Packaging Format : EIAJ-RC-1009B

7-2, Carrier tape dimensions unit : mm




7-3, Reel dimension




| ϕA | ϕB | ϕC | ϕD | E | W | W1 | W2 | R |
|---|---|---|---|---|---|---|---|---|
| ϕ330±2 | ϕ50 or more | ϕ13.0±0.5 | ϕ21.0±0.8 | 2.0±0.5 | 16.4 +2/-0 | (2.0) | 22.4 or less | (1.0) |

7-4, Quantity : 1000 pcs. / Reel

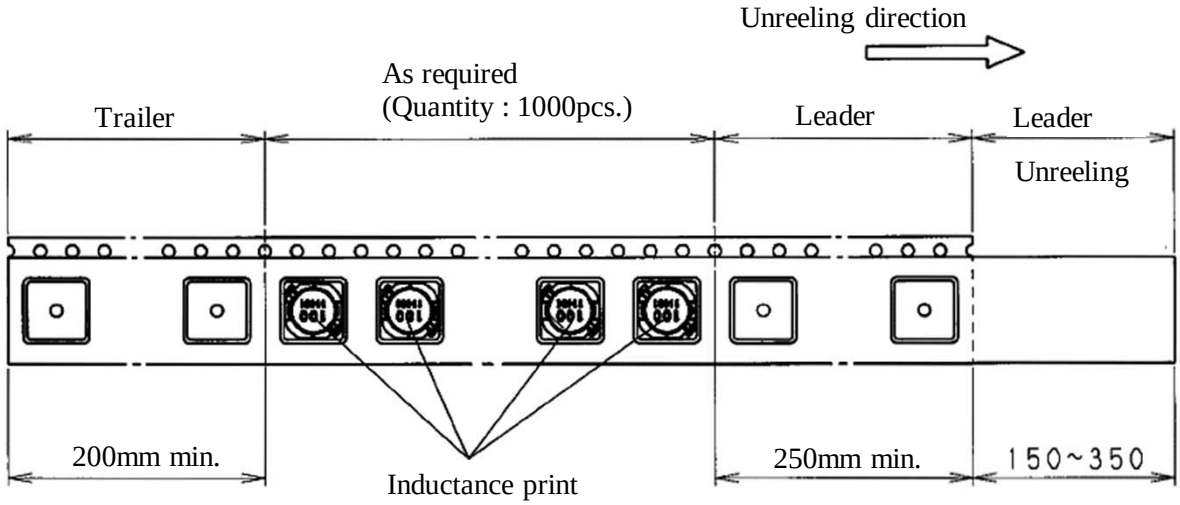
7-5, Marking : The following items shall be marked each unit park.

1, Customer P# 4, Inspection No.
2, TDK P# 5, Quantity
3, TDK P# cord 6, Manufacturing location

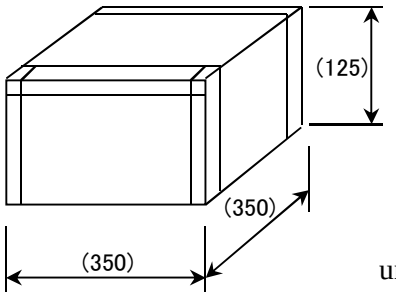
7-6, The products are packaged so that no damage will be sustained.

(7) Packaging

7-7, Taping dimensions unit : mm




7-8, Dimensions of carton




5,000 pcs./ carton
(1,000 pcs./ reel x 5)

unit : mm

(8) Note

8-1, If there occurs something to be discussed, it should be treated on deliberation between customer and TDK Corporation.

8-2, Please don't use the product that experienced falling.
However, If the falling is from less than 20cm high to vinyl-tile-like ground, The product with normal appearance and characteristics can be used.

8-3, Please don't apply the stress more 10N onto the top of the product.

8-4, If acoustic noise was occurred by magnetostrictive, it is preferable that reject or attenuate the audible frequency of current.

8-5, Some types of desiccants may cause characteristics degradation of this product.
Please contact us in advance if a desiccant is applied to this product.