ISO9001 ISO14001 IATF16949 **CHILISIN ELECTRONICS CORP.**

RoHS & Halogen Free & REACH Compliance.

SPECIFICATION FOR APPROVAL

Customer： _____

Customer P/N: _____

Drawing No： _____

Quantity： 0 **Pcs.** **Date：** _____

Chilisin P/N： **BCTH Series**

SPECIFICATION ACCEPTED BY:	
COMPONENT ENGINEER	
ELECTRICAL ENGINEER	
MECHANICAL ENGINEER	
APPROVED	
REJECTED	

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Drawn by	Checked by	Approved by
Desmond.Wu	**Cf.Hsieh**	**Wl.Liu**

ISO9001 ISO14001 IATF16949 CHILISIN ELECTRONICS CORP.

BCTH Series Specification

1 Scope:

1-1 This specification is applicable to lead free and halogen free of RoHS directive for BCTH series high power thick film chip resistors.

1-2 The product is for general purpose

2 Part Numbering:

B C T H	0 0	0 4 0 2	-	1 0 0 X	J	T H
Series	**Internal Code**	**Dimension (inch)**		**Resistance Value**	**Tolerance**	**Taping Code**
BCTH: High Power Thick Film Chip Resistors		0201 0402 0603 0805 1206 1210 2010 2512		J Tol _3 digit + X: EX. 10Ω=100 47Ω=470 JUMPER=000X B/D/F Tol_4 digit: Ex. 10.2 Ω = 10R2 10KΩ = 1002 JUMPER=0000	B=± 0.1% D=± 0.5% F=± 1% J=± 5%	TH(10,000pcs/reel,15,000pcs/reel)：0201, 0402 TP(5,000pcs/reel)：0603, 0805, 1206, 1210 TE(4,000pcs/reel)：2010, 2512

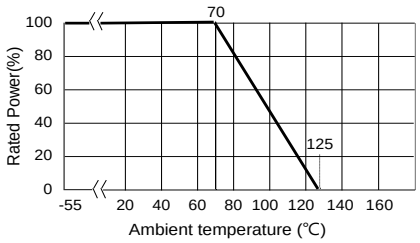
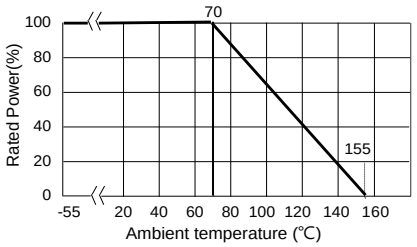
3 SPECIFICATIONS:

Type	Rated Power at 70℃	Max. Working Voltage	Max. Overload Voltage	T.C.R (ppm/℃)	Resistance Range				JUMPER Rated Power		JUMPER Resistance Value	
					B(±0.1%) E-24、E-96	D(±0.5%) E-24、E-96	F(±1%) E-24、E-96	J(±5%) E-24	J (±5%)	F (±1%)	J (±5%)	F (±1%)
BCTH 0201	1/16 W	25V	50V	-200 +400	------	1Ω≦R＜10Ω	1Ω≦R＜10Ω	1Ω≦R＜10Ω	--	--	--	--
				±200	------	10Ω≦R≦10MΩ	10Ω≦R≦10MΩ	10Ω≦R≦10MΩ				
BCTH 0402	1/8 W	50V	100V	±100	100Ω≦R≦1MΩ	10Ω≦R≦1MΩ	10Ω≦R≦10MΩ	10Ω≦R≦20MΩ	1.5A	2A	50mΩ	20mΩ
				±200	------	------	1Ω≦R＜10Ω	1Ω≦R＜10Ω			MAX.	MAX.
BCTH 0603	1/5 W	75V	150V	±100	100Ω≦R≦1MΩ	10Ω≦R≦1MΩ	10Ω≦R≦10MΩ	10Ω≦R≦20MΩ	1.5A	2.5A	50mΩ	20mΩ
				±200	------	1Ω≦R＜10Ω	1Ω≦R＜10Ω	1Ω≦R＜10Ω			MAX.	MAX.
BCTH 0805	1/4 W	150V	300V	±100	100Ω≦R≦1MΩ	10Ω≦R≦10MΩ	10Ω≦R≦10MΩ	10Ω≦R≦20MΩ	2.5A	3.5A	50mΩ	20mΩ
				±200	------	1Ω≦R＜10Ω	1Ω≦R＜10Ω	1Ω≦R＜10Ω			MAX.	MAX.
BCTH 1206	1/2 W	200V	400V	±100	10Ω≦R≦1MΩ	10Ω≦R≦10MΩ	10Ω≦R≦10MΩ	10Ω≦R≦20MΩ	3A	5A	50mΩ	20mΩ
				±200	3Ω≦R＜10Ω	1Ω≦R＜10Ω	1Ω≦R＜10Ω	1Ω≦R＜10Ω			MAX.	MAX.
BCTH 1210	3/4 W	200V	400V	±100	100Ω≦R≦1MΩ	10Ω≦R≦10MΩ	10Ω≦R≦10MΩ	10Ω≦R≦20MΩ	4A	6A	50mΩ	20mΩ
				±200	------	------	1Ω≦R＜10Ω	1Ω≦R＜10Ω			MAX.	MAX.
BCTH 2010	1W	200V	400V	±100	------	------	10Ω≦R≦10MΩ	10Ω≦R≦10MΩ	4.5A	7A	50mΩ	20mΩ
				±200			1Ω≦R＜10Ω	1Ω≦R＜10Ω			MAX.	MAX.
BCTH 2512	2 W	200V	400V	±100	100Ω≦R≦100K	100Ω≦R≦100K	10Ω≦R≦10MΩ	10Ω≦R≦10MΩ	6A	10A	50mΩ	20mΩ
				±200	------	------	1Ω≦R＜10Ω	1Ω≦R＜10Ω			MAX.	MAX.
Operating Temperature Range				-55℃ ~ +155℃ (0201:-55℃ ~ +125℃)								

Peak current = rated current *2.5 times

BCTH Series Specification

3.2 Power Derating Curve:

Type	BCTH_0201	Other
Operating Temperature Range	－55℃ ~ ＋125℃	－55℃ ~ ＋155℃
Explain	For resistors operated in ambient temperatures above 70℃, power rating shall be derated in accordance with figure below..	For resistors operated in ambient temperatures above 70℃, power rating shall be derated in accordance with figure below.
Figure		

3.3 Voltage Rating or Current Rating:

Resistance Range:≧1Ω

Rated Voltage: The resistor shall have a DC continuous working voltage or a rms. AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined from the following:

$E = \sqrt{R \times P}$

E= Rated voltage (v)

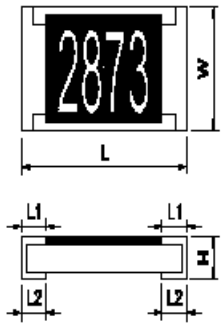
P= Power rating (w)

R= Nominal resistance(Ω)

ISO9001 ISO14001 IATF16949 CHILISIN ELECTRONICS CORP.

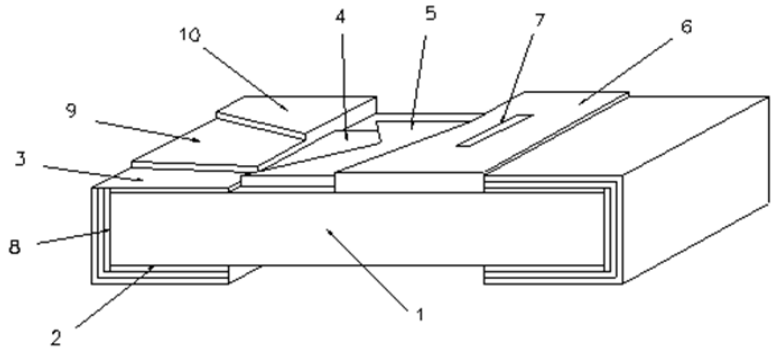
BCTH Series Specification

4 Dimensions (mm) :



Type \ Dimension / Size Code		L	W	H	L1	L2
BCTH	**0201**	0.60±0.03	0.30±0.03	0.23±0.03	0.15±0.05	0.15±0.05
BCTH	**0402**	1.00±0.10	0.50±0.05	0.30±0.05	0.20±0.10	0.25±0.10
BCTH	**0603**	1.55±0.10	0.80±0.10	0.45±0.10	0.30±0.15	0.30±0.15
BCTH	**0805**	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.35±0.15
BCTH	**1206**	3.05±0.10	1.55±0.10	0.50±0.10	0.45±0.20	0.35±0.15
BCTH	**1210**	3.05±0.10	2.55±0.10	0.55±0.10	0.50±0.20	0.50±0.20
BCTH	**2010**	4.95±0.10	2.45±0.10	0.70±0.10	0.65±0.20	0.60±0.20
BCTH	**2512**	6.40±0.20	3.20±0.20	0.70±0.10	0.60±0.20	1.25±0.20

5 Structure Graph:

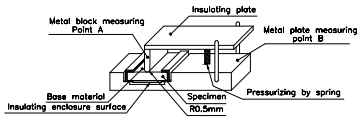


1	Ceramic substrate	6	2nd Protective coating
2	Bottom inner electrode	7	Marking
3	Top inner electrode	8	Terminal inner electrode
4	Resistive layer	9	Ni plating
5	1st Protective coating	10	Sn plating

BCTH Series Specification

6 Reliability Test:

1.1 Electrical Performance Test

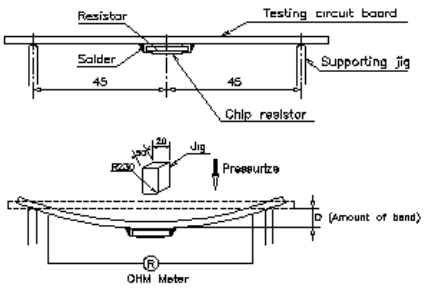
No	Item	Conditions	Specifications Resistors
1-1-1	Temperature Coefficient of Resistance (TCR)	TCR (ppm/℃) = $\frac{(R2-R1)}{R1\ (T2-T1)}$ X 10^6 ●R1: Resistance at room temperature ●R2: Resistance at -55℃ or +125℃ ●T1: Room temperature ●T2: Temperature -55℃ or +125℃ ●Refer to JIS-C5201-1 4.8	Refer to item 3. general specificationsns
1-1-2	Short Time Overload	Applied 2.5 times rated voltage for 5 seconds and release the rate. (Rated voltage refer to item 3. general specifications) Refer to JIS-C5201-1 4.13	0.1%、0.5%、1%: △R%= ±1.0% 5%: △R%=± 2.0% No evidence of mechanical damage. No short or burned on the appearance.
1-1-3	Insulation Resistance	Put the resistor in the fixture, add 100 VDC in + ,- terminal for 60 sec then measured the insulation resistance between electrodes and insulating enclosure or between electrodes and base material.  Refer to JIS-C5201-1 4.6	≧10^9Ω
1-1-4	Dielectric Withstanding Voltage	Put the resistor in the fixture, add VAC (see SPEC below) in +,- terminal for. 0805、1206、1210、2010、2512 apply 500 VAC 1 minute. 0402、0603 apply 300 VAC 1 minute. Refer to JIS-C5201-1 4.7	No short or burned on the appearance.

BCTH Series Specification

1-2. Mechanical Performance Test

No	Item	Conditions of Test	Specifications Resistors
1-2-2	Terminal Strength	Test 1 : The resistor mounted on the board applied 5N pushing force on the sample rear for 10 sec. (0201:3N) Test 2 : The resistor mounted on the board slowly add force on the sample rear until the sample termination is breakdown. Refer to JIS-C5201-1 4.16	Test 1 : No evidence of mechanical damage. Test 2 : 0201≧3N Other Type≧5N
1-2-3	Resistance to Solvent	The tested resistor be immersed into isopropyl alcohol of 20~25℃ for 5 minutes, then the resistor is left in the room for 48 hrs, and measured its resistance variance rate. Refer to JIS-C5201-1 4.29	BCTH_0201:± 1.0% Other type:± 0.5%
1-2-4	Solderability	Preconditioning: Put the tested resistor in the apparatus of PCT, at a temperature of 105℃, humidity of 100% RH, and pressure of 1.22×10^5 Pa for a duration of 4 hours. Then after left the tested resistor in room temperature for 2 hours or more. Test method: The resistor be immersed into solder pot in temperature 235±5℃ for 2 sec, then the resistor is left as placed under microscope to observed its solder area. Refer to JIS-C5201-1 4.17	Solder coverage over 95%.
1-2-5	Resistance to Soldering Heat	◎Test method 1 (Solder pot test): The tested resistor be immersed into molten solder of 260+5/-0℃ for 10 seconds. Then the resistor is left in the room for 1 hour. ◎Test method 2 (Solder pot test): The tested resistor be immersed into molten solder of 260+5/-0℃ for 30 seconds. Then the resistor is left as placed under microscope to observe its solder area. ◎Test method 3 (Electric iron test): Preheating temperature : 350±10℃ Electric iron preheating time : 3+1/-0 sec Preheating the electric iron on electrode termination, as after that step placed the iron over 60 min. and measured its resistance variance rate. Refer to JIS-C5201-1 4.18	Test item 1: (1).Variance rate on resistance △R%=± 1.0% Test item 2: (1).Solder coverage over 95%. (2).The underlying material(such as ceramic) shall not be visible at the crest corner area of the electrode. Test item 3: (1).Variance rate on resistance △R%=± 1.0%

BCTH Series Specification

No	Item	Conditions of Test	Specifications Resistors
1-2-6	Joint Strength of Solder	◎Bending Strength: Solder tested resistor on to PC board add force in the middle down, and under load measured its resistance variance rate. D:0402、0603、0805=5mm 0201、1206、1210=3mm 2010、2512=2mm  Refer to JIS-C5201-1 4.33	△R%=± 1.0%

BCTH Series Specification

1-3. Environmental Test

No	Item	Conditions of Test	Specifications Resistors
1-3-1	Resistance to Dry Heat	Put tested resistor in chamber under temperature 155±5℃ for 1000 +48/-0 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	0.1%、0.5%、1%: △R%=±1.0% 5%: △R%=±2.0%
1-3-2	Thermal Shock	Put the tested resistor in the chamber under the Thermal Shock which shown in the following table shall be repeated 300 times consecutively. Then leaving the tested resistor in the room temperature for 1 hours, and measure its resistance variance rate. Refer to MIL-STD 202 Method 107	0.1%、0.5%、1%: △R%=± 0.5% 5%: △R%=±1.0%
1-3-3	Loading Life in Moisture	Put the tested resistor in the chamber under temperature 40±2℃, relative humidity 90~95% and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.24	0.1%、0.5%、1%: △R%=± 0.5% 5%: △R%=±2.0%
1-3-4	Load Life	Put the tested resistor in chamber under temperature 70±2℃ and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	0.1%、0.5%、1%: △R%=± 0.5% 5%: △R%=±2.0%

Testing Condition	
Low est Temperature	-55±5℃
Highest Temperature	125±5℃
Temperature-retaining time	15 minutes each

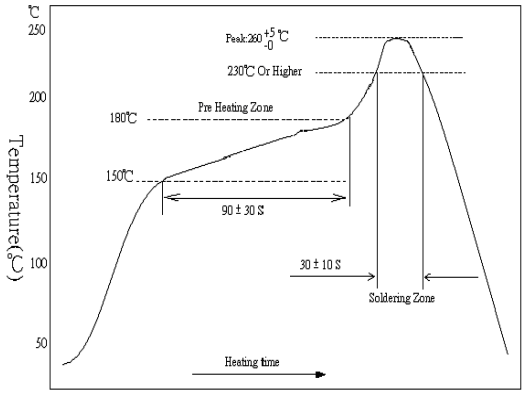
BCTH Series Specification

7 Technical application notes:

(This is for recommendation, please customer perform adjustment according to actual application)

7.1 Recommend Soldering Method:

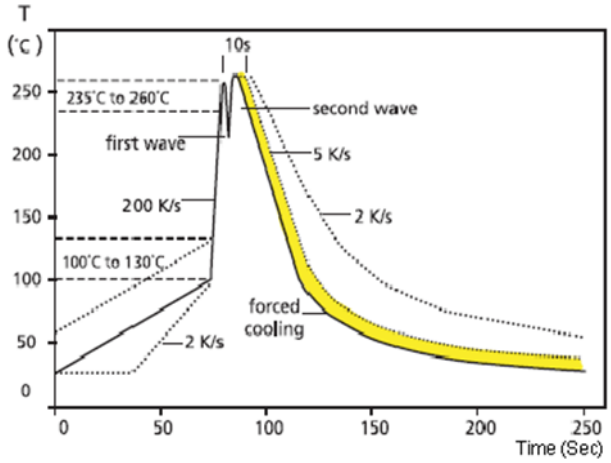
7.1.1 Lead Free Reflow Soldering Profile



Remark1:Recommended IR Reflow Soldering Profile MEET J-STD-020D.

Remark2:The peak temperature of soldering heat is 260 +5/-0 ℃ for 10 seconds

7.1.2 Lead Free Double-Wave Soldering Profile.(This applies to 0603 size inclusive above products)

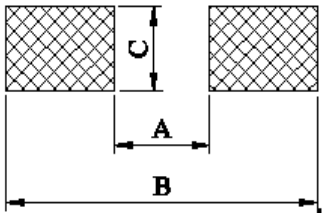


7.1.3 Soldering Iron: temperature 350°C±10°C , dwell time shall be less than 3 sec.

BCTH Series Specification

8 Recommend Land Pattern Design (For Reflow Soldering):

When a component is soldered, the resistance after soldering changes slightly depending on the size of the soldering area and the amount of soldering. When designing a circuit, it is necessary to consider the effect of a decrease or increase in its resistance.



Unit:mm

DIM / TYPE	A	B	C
0201	0.3	1	0.4
0402	0.5	1.5	0.6
0603	0.8	2.1	0.9
0805	1.2	3	1.3
1206	2.2	4.2	1.6
1210	2.2	4.2	2.8
2010	3.5	6.1	2.8
2512	3.8	8	3.5

8.1 Environment Precautions:

This specification product is for general electronic use, CHILISIN will not be responsible for any damage, cost or loss caused by using this specification product in any special environment. If other applications need to confirm with CHILISIN.

If consumer intends to use our Company product in special environment or condition (including but not limited to those mentioned below), then will need to make individual recognition of product features and reliability accordingly.

(a) Used in high temperature and humidity environment

(b) Exposed to sea breeze or other corrosive gas, such as Cl2、H2S、NH3、SO2 and NO2.

(c) Used in non-verified liquids including water, oil, chemical and organic solvents.

(d) Using non-verified resin or other coating material to seal or coat our Company product.

(e) After soldering, it is necessary to use water-soluble detergents to clean residual solder fluxes, even though no-clean fluxes are recommended.

8.2 Momentary Overload Precautions:

The product might be out of function when momentary overloaded.
Please make sure to avoid momentary overloading while using and preserving。

8.3 Operation and Processing Precautions:

(a) Avoid damage to the edge of resistor and protective layer caused by mechanical stress.
(b) Handle with care when printing circuit board (PCB) is divided or fixed on support body, because bending of printing circuit board (PCB) mounting will make mechanical stress for resistors.
(c) Make sure the power rating is under the limit when using the resistor. When power rating is over the limit, the resister will be overloaded. There might be machinery damage due to the climbing temperature.
(d) If the resister will be exposed under massive impact load (shock wave) in a short period of time, the working environment must be set up well before use.
(e) Please make evaluation and confirmation when the product is well used in your company and have a through consideration of it's fail-safe design to ensure the system safety.

9 Storage and transportation requirement:

1.1 The temperature condition must be controlled as 25±5℃, the R.H. must be controlled as 60±15%. The stock can maintain quality level in two years.
1.2 Please avoid the mentioned harsh environment below when storing to ensure product performance and its' weldability. Places exposed to sea breeze or other corrosive gas, such as Cl2、H2S、NH3、SO2 and NO2.
1.3 When the product is moved and stored, please ensure the correct orientation of the box. Do not drop or squeeze the box. Otherwise, the electrode or the body of the product may be damaged.

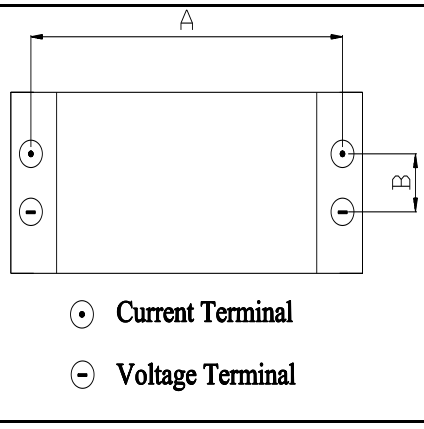
BCTH Series Specification

10 Plating Thickness:

9.1 Ni:≧2μm
9.2 Sn(Tin):≧3μm
9.3 Sn(Tin):Matte Sn

11 Measurement Point:

Bottom electrode



Unit : mm

DIM / TYPE	A	B
0201	0.44±0.05	0.22 ±0.05
0402	0.80±0.05	0.24 ±0.05
0603	1.35±0.05	0.35 ±0.05
0805	1.80 ±0.05	0.35 ±0.05
1206	2.90 ±0.05	0.35 ±0.05
1210	2.90 ±0.05	0.35 ±0.05
2010	4.50 ±0.05	1.15 ±0.05
2512	5.90 ±0.05	1.60 ±0.05

BCTH Series Specification

11 Stock period:

The temperature condition must be controlled at 25±5℃, the R.H. must be controlled at 60±15%. The stock can maintain quality level in two years。

12 The carton packaged for electronic-information products is made by the symbol as follows: (For china)

	
Marking for control of pollution cause by electronic-information products	Marking for package recovery

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BCTH Series Specification

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