Data Sheet No：E20001

Version：V2

Date：2023/11/20

睿思

TCTR

NTC Chip Thermistor

Size	0402~0805
Tolerance	±1%~±10%
B Value Tolerance	±1%~±5%
B Value	3010K~4800K

Applications

Automotive Electronics

Medical Equipment

Industrial Control Equipment

Smart Home Appliances

Better Solution for Sustainable High End Manufacturing

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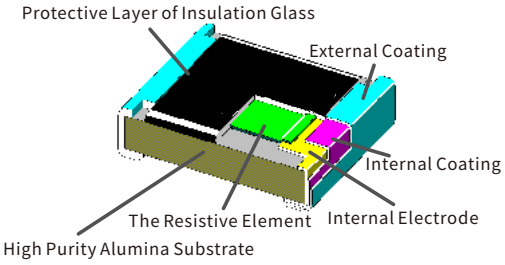
TCTR

NTC Chip Thermistor

Tight Tolerance of Temperature Detection

High Reliability, AEC-Q200 Qualified



Introduction

TCTR series thermistors developed independently by C&B Electronics are based on the structure of ceramic films, using the third-generation NTC thick film mounting technology and sintering with special electrode structures. The temperature detection tolerance over the entire temperature range can reach ± 0.1 ℃. The mature thick film manufacturing process allows the minimum thermal time constant of TCTR to reach 1 second, which is twice as fast as other types of products at the same size. The thick film structure minimizes the thermal shock caused by soldering, making it suitable for applications that require high stability and reliability. The special end electrode structure can effectively release the thermal shock and the mechanical stress caused by PCB bending.

TCTR series is AEC-Q200 compliant. Some part numbers comply with UL1434 standards. All parts with B25/85 at 3000K and above can have a maximum operating temperature of 150 ℃, while parts with B25/85 below 3000K can have a maximum operating temperature of 125 ℃.

Electrical Parameters

Series	Rated Power	Dissipation Constant δ≤1.5mW/℃	Thermal Time Constant τ≤5.0sec	Max. Operating Power	Resistance Tolerance %	B Value Tolerance %	Operating Temperature
TCTR0402	110mW	≒1.1mW/℃	≒1.5sec	5mW	±1, ±2 ±3, ±5, ±10	±1, ±2 ±3, ±5	-40℃~+125℃
TCTR0603	120mW	≒1.2mW/℃	≒2.0sec	5mW	±1, ±2 ±3, ±5, ±10	±1, ±2 ±3, ±5	-40℃~+125℃
TCTR0805	130mW	≒1.3mW/℃	≒2.5sec	5mW	±1, ±2 ±3, ±5, ±10	±1, ±2 ±3, ±5	-40℃~+125℃

B Value & Resistance Table

B Value (25℃/85℃)[1]	Standard Resistance Range(25℃)		
	TCTR0402 (Ω)	TCTR0603 (Ω)	TCTR0805 (Ω)
4610K~4800K	75K~820K	47K~1.6M	24K~470K
4410K~4600K	24K~470K	15K~910K	8.2K~430K
4210K~4400K	9.1K~110K	6.2K~200K	3.0K~91K
4010K~4200K	7.5K~100K	4.7K~200K	2.7K~91K
3810K~4000K	3.6K~62K	2.4K~110K	1.2K~51K
3610K~3800K	2K~30K	1.2K~56K	620~27K
3410K~3600K	1.8K~30K	1.1K~56K	620~27K
3210K~3400K	2.4K~22K	1.5K~43K	750~18K
3010K~3200K	1.1K~10K	750~20K	390~9.1K

1、B value: Calculated from the resistance without load at 25℃ and 85℃. Other B value products can be customized.

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Resistance & Temperature Table

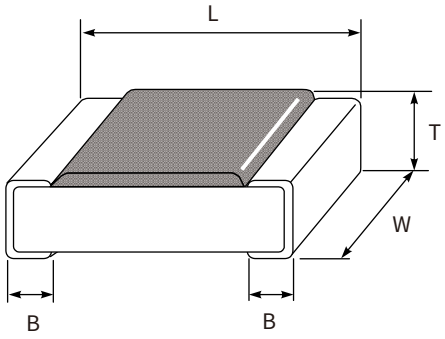
Resistance (25℃) / B value (25℃/85℃) Unit：Ω

TEMP. (℃)	R:1KΩ B:3000K	R:1KΩ B:3200K	R:10KΩ B:3450K	R:10KΩ B:3700K	R:10KΩ B:3900K	R:10KΩ B:4100K	R:100KΩ B:4300K	R:100KΩ B:4500K	R:100KΩ B:4700K
-40	14,270.0	17,200.0	217,300.0	274,600.0	331,000.0	399,100.0	4,039,000.0	4,870,000.0	5,871,000.0
-35	11,130.0	13,180.0	162,800.0	201,100.0	238,200.0	282,000.0	2,878,000.0	3,408,000.0	4,036,000.0
-30	8,761.0	10,200.0	123,300.0	149,000.0	173,400.0	201,800.0	2,073,000.0	2,413,000.0	2,808,000.0
-25	6,953.0	7,959.0	94,240.0	111,600.0	127,700.0	146,200.0	1,508,000.0	1,727,000.0	1,976,000.0
-20	5,561.0	6,265.0	72,720.0	84,410.0	95,100.0	107,100.0	1,108,000.0	1,248,000.0	1,407,000.0
-15	4,481.0	4,972.0	56,620.0	64,470.0	71,530.0	79,370.0	821,600.0	911,600.0	1,011,000.0
-10	3,636.0	3,976.0	44,450.0	49,690.0	54,330.0	59,400.0	614,500.0	671,900.0	734,600.0
-5	2,971.0	3,202.0	35,170.0	38,630.0	41,640.0	44,890.0	463,500.0	499,700.0	538,600.0
0	2,443.0	2,597.0	28,040.0	30,280.0	32,200.0	34,240.0	352,500.0	374,800.0	398,500.0
5	2,020.0	2,120.0	22,520.0	23,920.0	25,100.0	26,340.0	270,100.0	283,400.0	297,400.0
10	1,681.0	1,742.0	18,210.0	19,040.0	19,730.0	20,440.0	208,500.0	216,000.0	223,900.0
15	1,406.0	1,440.0	14,820.0	15,260.0	15,620.0	15,990.0	162,100.0	165,900.0	169,800.0
20	1,183.0	1,197.0	12,140.0	12,310.0	12,450.0	12,600.0	126,900.0	128,400.0	129,800.0
25	1,000.0	1,000.0	10,000.0	10,000.0	10,000.0	10,000.0	100,000.0	100,000.0	100,000.0
30	849.5	840.1	8,286.0	8,172.0	8,082.0	7,993.0	79,300.0	78,430.0	77,570.0
35	725.0	709.4	6,903.0	6,718.0	6,573.0	6,432.0	63,280.0	61,920.0	60,580.0
40	621.5	601.8	5,782.0	5,554.0	5,378.0	5,208.0	50,790.0	49,190.0	47,630.0
45	535.1	513.0	4,867.0	4,617.0	4,426.0	4,243.0	41,010.0	39,310.0	37,690.0
50	462.6	439.2	4,116.0	3,858.0	3,663.0	3,477.0	33,290.0	31,610.0	30,010.0
55	401.5	377.7	3,498.0	3,240.0	3,047.0	2,866.0	27,170.0	25,560.0	24,040.0
60	349.9	326.1	2,986.0	2,734.0	2,548.0	2,375.0	22,300.0	20,780.0	19,360.0
65	306.0	282.6	2,560.0	2,318.0	2,141.0	1,978.0	18,390.0	16,980.0	15,690.0
70	268.6	246.0	2,203.0	1,974.0	1,808.0	1,656.0	15,240.0	13,960.0	12,780.0
75	236.5	214.8	1,904.0	1,688.0	1,533.0	1,392.0	12,690.0	11,530.0	10,470.0
80	209.0	188.3	1,652.0	1,450.0	1,306.0	1,177.0	10,620.0	9,566.0	8,617.0
85	185.3	165.6	1,439.0	1,251.0	1,118.0	998.8	8,927.0	7,978.0	7,130.0
90	164.8	146.2	1,258.0	1,083.0	960.2	851.5	7,537.0	6,684.0	5,928.0
95	147.0	129.4	1,103.0	940.9	828.2	729.0	6,392.0	5,626.0	4,953.0
100	131.5	115.0	971.3	820.6	717.1	626.7	5,444.0	4,757.0	4,157.0
105	118.0	102.4	857.7	718.3	623.2	540.8	4,655.0	4,040.0	3,505.0
110	106.2	91.5	759.8	630.9	543.6	468.5	3,998.0	3,445.0	2,969.0
115	95.8	82.0	675.3	555.9	475.9	407.3	3,447.0	2,950.0	2,525.0
120	86.7	73.7	601.9	491.5	418.0	355.4	2,983.0	2,537.0	2,157.0
125	78.6	66.4	538.1	435.9	368.3	311.2	2,592.0	2,190.0	1,850.0
150	50.0	41.0	320.3	250.0	205.1	168.2	1,356.0	1,112.0	912.4

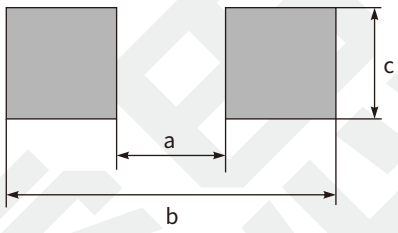
Dimensions

Unit：mm

Resistor



Land Pattern



Series	L	W	T	B	a	b	c	Packaging	Quantity Reel	Net Weight
TCTR0402	1.00±0.05	0.50±0.05	0.35±0.05	0.25+0.05/-0.10	0.50	1.30	0.50	Tape&Reel	10000pcs	0.587mg
TCTR0603	1.60±0.15	0.80±0.15	0.50±0.10	0.30±0.20	0.90	2.60	0.70	Tape&Reel	5000pcs	2.083mg
TCTR0805	2.00±0.20	1.25±0.20	0.55±0.10	0.40±0.20	1.35	3.45	1.10	Tape&Reel	5000pcs	4.819mg

Part Number Information

Example：TCTR0805J1K00H3200T（TCTR 0805 ±5% 1KΩ ±3% 3200K Tape&Reel）

T	C	T	R	0	8	0	5	J	1	K	0	0	H	3	2	0	0	T

Series	Size	Tolerance	Resistance	B Value Tolerance	B Value	Packaging
TCTR	0402 0603 0805	F=±1% G=±2% H=±3% J=±5% K=±10%	1R00=1R 1K00=1000R 1M00=1000000R 1M60=1600000R	F=±1% G=±2% H=±3% J=±5%	3200=3200K 4000=4000K 4800=4800K	T=Tape&Reel

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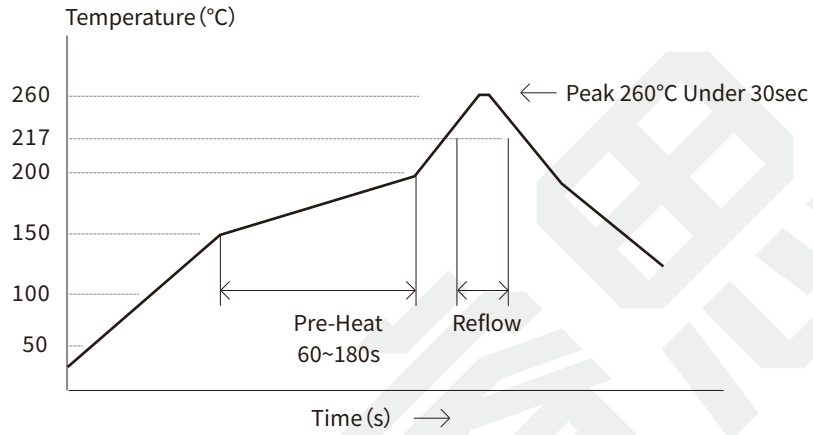
Performance

Test	Test Method	Standards	△R	△B
High Temperature Storage	1000h@+150°C，No load.	MIL-STD-202G Method 108	△R≤±3%	△B≤±2%
Low Temperature Storage	1000h@-40°C，No load.	IEC 60115- 1 4.25	△R≤±3%	△B≤±2%
Temperature Cycling	-40°C，+150°C，30 minutes each，100 cycles.	IEC 60115- 1 4.19	△R≤±3%	△B≤±2%
Bias Humidity	+85°C，85%RH，loading 5mW，1000h，1.5h on ，0.5h off.	IEC 60115- 1 4.24	△R≤±3%	△B≤±2%
Resistance to Solder Heat	+260°C tin bath for 10s	IEC 60115- 1 4.18	△R≤±3%	
Solderability	+245°C tin bath for 3s	IEC 60115 - 1 4.17	95% minimum coverage	
Substrate Bending	5mm，10s	IEC 60115- 1 4.33	△R≤±3%	
Vibration	10-55Hz, X, Y, Z three orientations. Amplitude peak-to-peak=1.5mm; One cycle, 2 hours in each direction of X, Y and Z.	IEC 60115- 1 4.22	△R≤±3%	

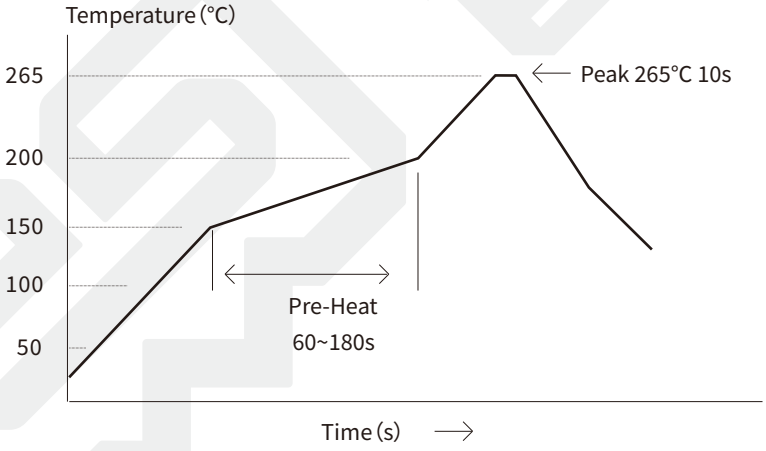
Reflow Soldering Profile

Resistor Surface Temperature:
Pre-Heat: +150°C~+200°C, 60~180sec.
Reflow: +217°C, 60~150sec.
Max. Temperature: +255°C~+260°C, within 30 sec.
Applicable Solder Composition: Sn-Ag-Cu solder
Cycles: limited to 3



Flow Soldering Profile

Resistor Surface Temperature:
Pre-Heat: +150°C~+200°C, 60~180sec.
Max. Temperature: +265°C, 10sec.
Applicable Solder Composition: Sn-Ag-Cu solder
Cycles: limited to 3



Marking

0402, 0603, 0805: No marking

Size	Illustration	Demonstration
0402 0603 0805		No Marking

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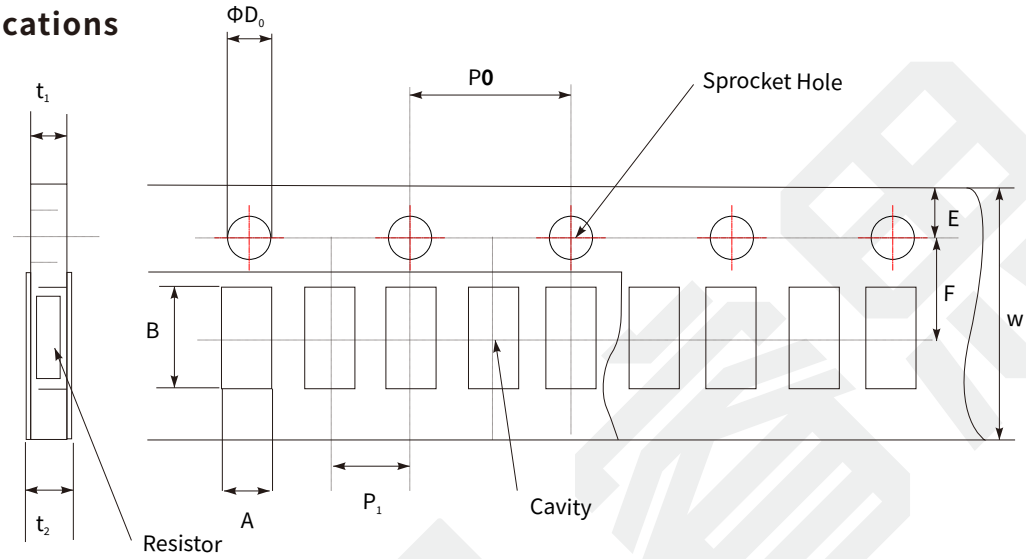
Packaging

Tape Specifications

Unit:mm

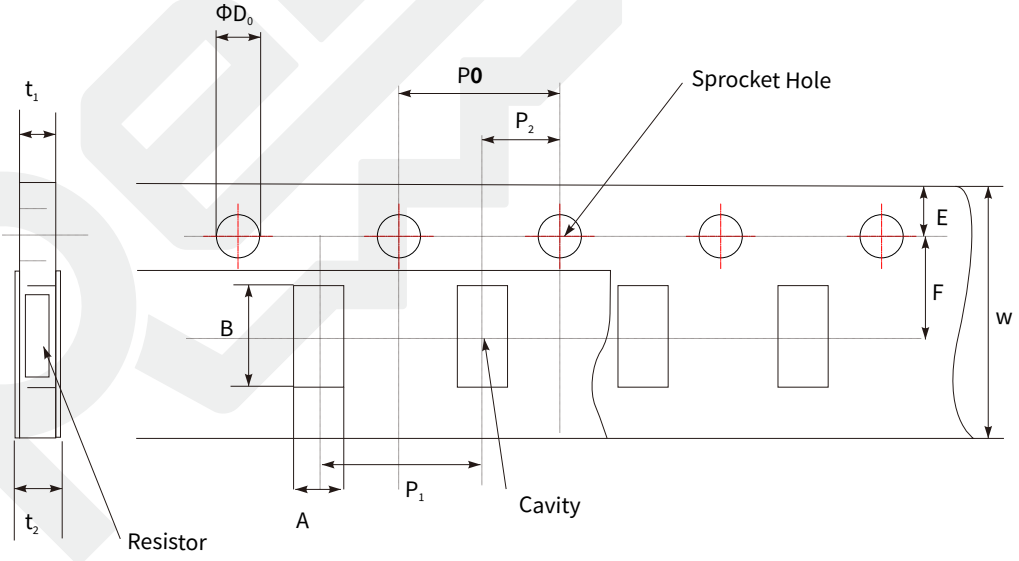
2 mm pitch



Series	A	B	W	F	E	P1	P0	ΦD0	t1	t2
TCTR0402	0.65±0.10	1.15±0.05	8.00±0.2	3.50±0.05	1.75±0.1	2.00±0.05	4.00±0.1	1.55±0.05	0.5max.	0.52±0.05

Unit:mm

4 mm pitch

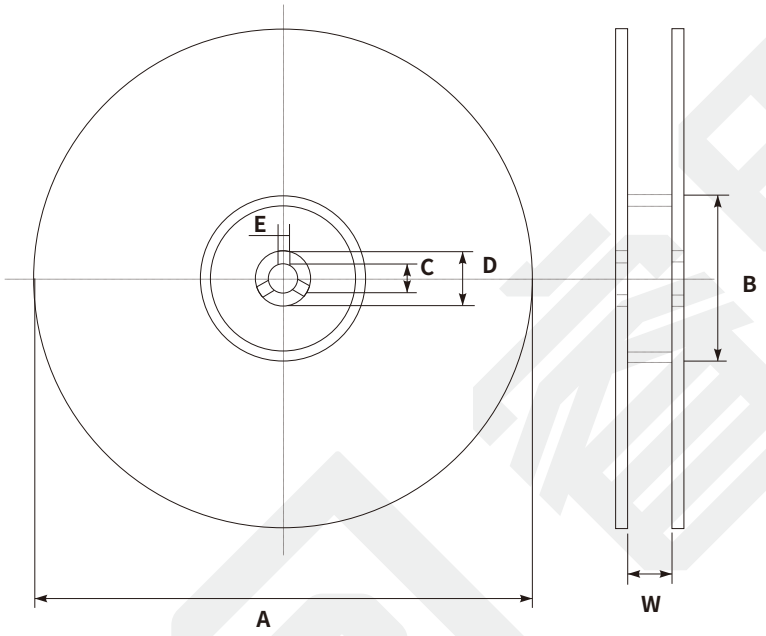


Series	A	B	W	F	E	P1	P2	P0	ΦD0	t1	t2
TCTR0603	1.10±0.1	1.90±0.1	8.00±0.2	3.50±0.05	1.75±0.1	4.00±0.1	2.00±0.05	4.00±0.1	1.55±0.05	1.0max.	1.4max
TCTR0805	1.65±0.15	2.40±0.15	8.00±0.2	3.50±0.05	1.75±0.1	4.00±0.1	2.00±0.05	4.00±0.1	1.55±0.05	1.0max.	1.4max

Packaging

Reel Specifications

Unit:mm



A	B	C	D	E	W
Φ180+0.0/-3.0	Φ60+1.0/-0.0	Φ13.0±0.20	Φ21.0±0.80	Φ2.00±0.50	9.00+1.0/-0.0

Revision

Version	Revised Content	Date	Approver
V0	Initial Issue	2019.12.13	LWW
V1	1. Change the "B value" in all descriptions to "B25/85" 2. Delete data below 3000K 3. Add data of 150 ℃ to the Resistance & Temperature Table 4. Add descriptive notes5. Change the logo in the datasheet	2019.12.25	LWW
V2	1. Change datasheet to the new template 2. Add solder pad dimensions 3. Add Soldering Profile 4. Add packaging dimensions	2023.11.20	LWW

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