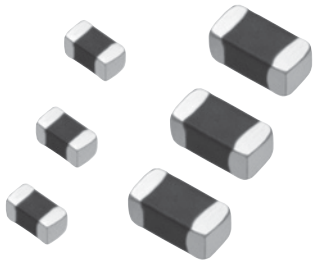
Multilayer NTC Thermistors

Series: **ERTJ**



Features

- Surface Mount Device (0402, 0603)
- Highly reliable multilayer / monolithic structure
- Wide temperature operating range (–40 to 150 °C)
- Environmentally-friendly lead-free
- AEC-Q200 qualified
- RoHS compliant

Recommended Applications

- For car audio system
- For ECUs
- For electric pumps and compressors
- For LED lights
- For batteries
- For temperature detection of various circuits

Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12	
E	R	T	J	0	E	G	1	0	3	F	M	(Example)

Common Code			
Product Code		Type Code	
ERT	NTC Thermistors	J	Chip Type (SMD) Multilayer Type

Size Code	
0	"0402"
1	"0603"

Packaging Style Code	
E	"0402" Pressed Carrier Taping Punched Carrier Taping (Pitch : 2 mm)
V	"0603" Punched Carrier Taping (Pitch : 4 mm)

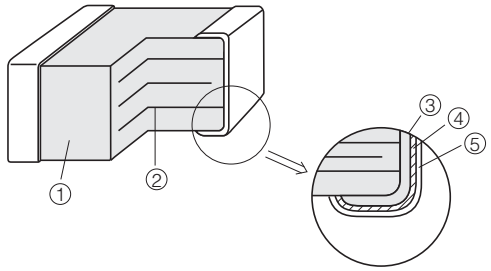
B Value Class Code	
A	2701 to 2800
G	3301 to 3400
M	3801 to 3900
P	4001 to 4100
R	4201 to 4300
S	4301 to 4400
T	4401 to 4500
V	4601 to 4700

Nominal Resistance R_{25} (Ω)
The first two digits are significant figures of resistance and the third one denotes the number of zeros following them.

Resistance Tolerance Code		
F	±1%	Narrow Tolerance Type
G	±2%	
H	±3%	Standard Type
J	±5%	

M	Automotive component

Construction



No.	Name	
①	Semiconductive Ceramics	
②	Internal electrode	
③	Terminal electrode	Substrate electrode
④		Intermediate electrode
⑤		External electrode

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

Ratings

Size code (EIA)	0(0402)	1(0603)
Operating Temperature Range	–40 to 150 °C	
Rated Maximum Power Dissipation*1	66 mW	100 mW
Dissipation Factor*2	Approximately 2 mW/°C	Approximately 3 mW/°C

*1 Rated Maximum Power Dissipation : The maximum power that can be continuously applied at the rated ambient temperature.
·The maximum value of power, and rated power is same under the condition of ambient temperature 25 °C or less. If the temperature exceeds 25 °C, rated power depends on the decreased power dissipation curve.
·Please see "Operating Power" for details.
*2 Dissipation factor : The constant amount power required to raise the temperature of the Thermistor 1 °C through self heat generation under stable temperatures.
·Dissipation factor is the reference value when mounted on a glass epoxy board (1.6 mmT).

Part Number List

● 0402(EIA)

Part Number	Nominal Resistance at 25 °C	B Value at 25/50(K)	B Value at 25/85(K)
ERTJ0EG103□M	10 kΩ	3380 K±1 %	3435 K±1 %
ERTJ0EP473□M	47 kΩ	4050 K±1 %	(4100 K)
ERTJ0ER104□M	100 kΩ	4250 K±1 %	(4300 K)
ERTJ0ET104□M	100 kΩ	4485 K±1 %	(4550 K)
ERTJ0EV104□M	100 kΩ	4700 K±1 %	(4750 K)
ERTJ0EV474□M	470 kΩ	4700 K±1 %	(4750 K)

□ : Resistance Tolerance Code (F : ±1%, G : ±2%, H : ±3%, J : ±5%)

● 0603(EIA)

Part Number	Nominal Resistance at 25 °C	B Value at 25/50(K)	B Value at 25/85(K)
ERTJ1VG103□M	10 kΩ	3380 K±1 %	3435 K±1 %
ERTJ1VP473□M	47 kΩ	4100 K±1 %	(4150 K)
ERTJ1VR104□M	100 kΩ	4200 K±1 %	(4250 K)
ERTJ1VV104□M	100 kΩ	4700 K±1 %	(4750 K)
ERTJ1VT224□M	220 kΩ	4485 K±1 %	(4550 K)

□ : Resistance Tolerance Code (F : ±1%, G : ±2%, H : ±3%, J : ±5%)

● Temperature and Resistance value (the resistance value at 25 °C is set to 1)/ Reference values

	ERTJ□□G~	ERTJ0EP~	ERTJ1VP~	ERTJ0ER~	ERTJ1VR~	ERTJ□□T~	ERTJ□□V~
$B_{25/50}$	(3380 K)	4050 K	4100 K	4250 K	4200 K	4485 K	4700 K
$B_{25/85}$	3435 K	(4100 K)	(4150 K)	(4300 K)	(4250 K)	(4550 K)	(4750 K)
T(°C)							
-40	20.52	33.10	34.56	42.40	40.49	46.47	59.76
-35	15.48	24.03	24.99	29.96	28.81	32.92	41.10
-30	11.79	17.63	18.26	21.42	20.72	23.55	28.61
-25	9.069	13.06	13.48	15.50	15.07	17.00	20.14
-20	7.037	9.761	10.04	11.33	11.06	12.38	14.33
-15	5.507	7.362	7.546	8.370	8.198	9.091	10.31
-10	4.344	5.599	5.720	6.244	6.129	6.729	7.482
-5	3.453	4.291	4.369	4.699	4.622	5.019	5.481
0	2.764	3.312	3.362	3.565	3.515	3.772	4.050
5	2.227	2.574	2.604	2.725	2.694	2.854	3.015
10	1.806	2.013	2.030	2.098	2.080	2.173	2.262
15	1.474	1.584	1.593	1.627	1.618	1.666	1.710
20	1.211	1.255	1.258	1.271	1.267	1.286	1.303
25	1	1	1	1	1	1	1
30	0.8309	0.8016	0.7994	0.7923	0.7944	0.7829	0.7734
35	0.6941	0.6461	0.6426	0.6318	0.6350	0.6168	0.6023
40	0.5828	0.5235	0.5194	0.5069	0.5108	0.4888	0.4721
45	0.4916	0.4266	0.4222	0.4090	0.4132	0.3896	0.3723
50	0.4165	0.3496	0.3451	0.3320	0.3363	0.3123	0.2954
55	0.3543	0.2881	0.2837	0.2709	0.2752	0.2516	0.2356
60	0.3027	0.2386	0.2344	0.2222	0.2263	0.2037	0.1889
65	0.2595	0.1985	0.1946	0.1831	0.1871	0.1658	0.1523
70	0.2233	0.1659	0.1623	0.1516	0.1554	0.1357	0.1236
75	0.1929	0.1393	0.1359	0.1261	0.1297	0.1117	0.1009
80	0.1672	0.1174	0.1143	0.1054	0.1087	0.09236	0.08284
85	0.1451	0.09937	0.09658	0.08843	0.09153	0.07675	0.06834
90	0.1261	0.08442	0.08189	0.07457	0.07738	0.06404	0.05662
95	0.1097	0.07200	0.06969	0.06316	0.06567	0.05366	0.04712
100	0.09563	0.06166	0.05957	0.05371	0.05596	0.04518	0.03939
105	0.08357	0.05306	0.05117	0.04585	0.04786	0.03825	0.03308
110	0.07317	0.04587	0.04415	0.03929	0.04108	0.03255	0.02791
115	0.06421	0.03979	0.03823	0.03378	0.03539	0.02781	0.02364
120	0.05650	0.03460	0.03319	0.02913	0.03059	0.02382	0.02009
125	0.04986	0.03013	0.02886	0.02519	0.02652	0.02043	0.01712

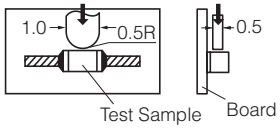
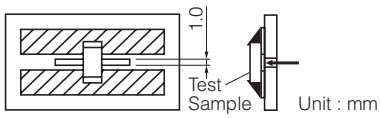
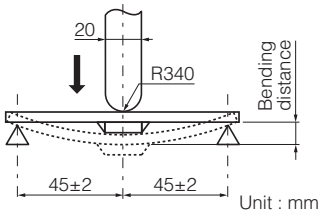
$$B_{25/50}=\frac{\ell n\ (R_{25}/R_{50})}{1/298.15-1/323.15}$$

$$B_{25/85}=\frac{\ell n\ (R_{25}/R_{85})}{1/298.15-1/358.15}$$

R_{25}=Resistance at 25.0±0.1 °C
R_{50}=Resistance at 50.0±0.1 °C
R_{85}=Resistance at 85.0±0.1 °C

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Specification and Test Method

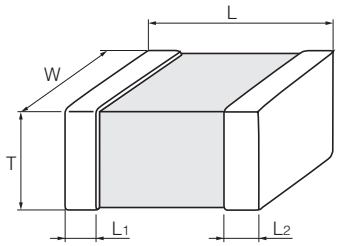
Item	Specification	Test Method
Rated Zero-power Resistance (R_{25})	Within the specified tolerance.	The value is measured at a power that the influence of self-heat generation can be negligible (0.1mW or less), at the rated ambient temperature of 25.0±0.1°C.
B Value	Shown in each Individual Specification. ✻ Individual Specification shall specify $B_{25/50}$ or $B_{25/85}$.	The Zero-power resistances; R_1 and R_2, shall be measured respectively at T_1 (deg.C) and T_2 (deg.C). The B value is calculated by the following equation. $B_{T_1/T_2} = \frac{\ell n\ (R_1) - \ell n\ (R_2)}{1/(T_1+273.15) - 1/(T_2+273.15)}$ T_1 / T_2: $B_{25/50}$ 25.0 ±0.1 °C / 50.0 ±0.1 °C; $B_{25/85}$ 25.0 ±0.1 °C / 85.0 ±0.1 °C
Adhesion	The terminal electrode shall be free from peeling or signs of peeling.	Applied force : Size 0402, 0603 : 5 N Duration : 10 s Size : 0402  Size : 0603 
Bending Strength	There shall be no cracks and other mechanical damage. R_{25} change : within ±5 %	Bending distance : 2 mm Bending speed : 1 mm/s 
Resistance to Vibration	There shall be no cracks and other mechanical damage. R_{25} change : within ±2 % B Value change : within ±1 %	Solder samples on a testing substrate, then apply vibration to them. Acceleration : 5 G Vibrational frequency : 10 to 2000 Hz Sweep time : 20 minutes 12 cycles in three directions, which are perpendicular to each other
Resistance to Impact	There shall be no cracks and other mechanical damage. R_{25} change : within ±2 % B Value change : within ±1 %	Solder samples on a testing substrate, then apply impacts to them. Pulse waveform : Semisinusoidal wave, 11 ms Impact acceleration : 50 G Impact direction : X-X', Y-Y', Z-Z' In 6 directions, three times each

Specification and Test Method

<table>
<tr><th>Item</th><th>Specification</th><th>Test Method</th></tr>
<tr><td>Resistance to Soldering Heat</td><td>There shall be no cracks and other mechanical damage.

R_{25} change : within ±2 %
B Value change : within ±1 %</td><td>Soldering bath method
Solder temperature : 260 ±5 °C, 270 ±5 °C
Dipping period : 3.0 ±0.5 s, 10.0 ±0.5 s
Preheat condition :
<table><tr><th>Step</th><th>Temp (°C)</th><th>Period (s)</th></tr><tr><td>1</td><td>80 to 100</td><td>120 to 180</td></tr><tr><td>2</td><td>150 to 200</td><td>120 to 180</td></tr></table></td></tr>
<tr><td>Solderability</td><td>More than 95 % of the soldered area of both terminal electrodes shall be covered with fresh solder.</td><td>Soldering bath method
Solder temperature : 230 ±5 °C
Dipping period : 4 ±1 s
Solder : Sn-3.0Ag-0.5Cu</td></tr>
<tr><td>Temperature Cycling</td><td>R_{25} change : within ±2 %
B Value change : within ±1 %</td><td>Conditions of one cycle
Step 1 : –55±3 °C, 30±3 min.
Step 2 : Room temp., 3 min. max.
Step 3 : 125±5 °C, 30±3 min.
Step 4 : Room temp., 3 min. max.
Number of cycles: 2000 cycles</td></tr>
<tr><td>Humidity</td><td>R_{25} change : within ±2 %
B Value change : within ±1 %</td><td>Temperature : 85 ±2 °C
Relative humidity : 85 ±5 %
Test period : 2000 +48/0 h</td></tr>
<tr><td>Biased Humidity</td><td>R_{25} change : within ±2 %
B Value change : within ±1 %</td><td>Temperature : 85 ±2 °C
Relative humidity : 85 ±5 %
Applied power : 10 mW(D.C.)
Test period : 2000 +48/0 h</td></tr>
<tr><td>Low Temperature Exposure</td><td>R_{25} change : within ±2 %
B Value change : within ±1 %</td><td>Temperature : –40 ±3 °C
Test period : 2000 +48/0 h</td></tr>
<tr><td>High Temperature Exposure 1</td><td>R_{25} change : within ±2 %
B Value change : within ±1 %</td><td>Temperature : 125 ±3 °C
Test period : 2000 +48/0 h</td></tr>
<tr><td>High Temperature Exposure 2</td><td>R_{25} change : within ±3 %
B Value change : within ±2 %</td><td>Temperature : 150 ±3 °C
Test period : 1000 +48/0 h</td></tr>
</table>

Dimensions in mm (not to scale)



(Unit : mm)

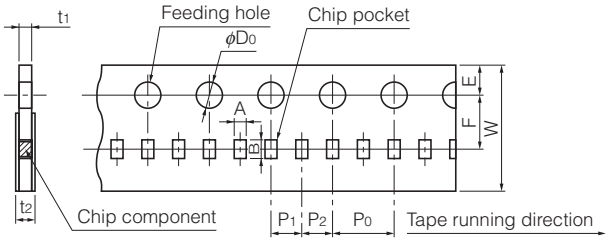
Size Code (EIA)	L	W	T	L_1, L_2
0 (0402)	1.0±0.1	0.50±0.05	0.50±0.05	0.25±0.15
1 (0603)	1.60±0.15	0.8±0.1	0.8±0.1	0.3±0.2

Packaging Methods

● Standard Packing Quantities

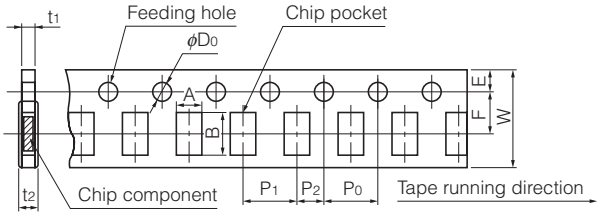
Size Code	Thickness (mm)	Kind of Taping	Pitch (mm)	Quantity (pcs./reel)
0 (0402)	0.5	Punched Carrier Taping	2	10,000
1 (0603)	0.8		4	4,000

● Pitch 2 mm (Punched Carrier Taping) : Size 0402



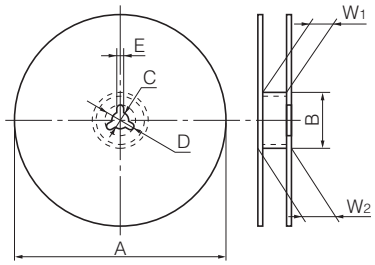
Symbol	A	B	W	F	E	P_1	P_2	P_0	ϕD_0	t_1	t_2
Dim. (mm)	0.62 ±0.05	1.12 ±0.05	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.0 ±0.1	$1.5^{+0.1}_{0}$	0.7 max.	1.0 max.

● Pitch 4 mm (Punched Carrier Taping) : Size 0603



Symbol	A	B	W	F	E	P_1	P_2	P_0	ϕD_0	t_1	t_2
Dim. (mm)	1.0 ±0.1	1.8 ±0.1	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	4.0 ±0.1	2.00 ±0.05	4.0 ±0.1	$1.5^{+0.1}_{0}$	1.1 max.	1.4 max.

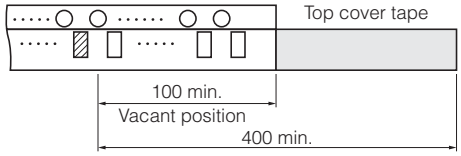
● Reel for Taping



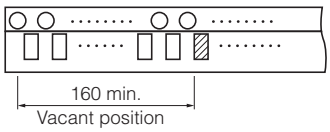
Symbol	φA	φB	C	D	E	W_1	W_2
Dim. (mm)	180^{0}_{-3}	$60.0^{+1.0}_{0}$	13.0±0.5	21.0±0.8	2.0±0.5	$9.0^{+1.0}_{0}$	11.4±1.0

● Leader Part and Taped End

Leader part



Taped end



(Unit : mm)

Minimum Quantity / Packing Unit

Part Number (Size)	Minimum Quantity/ Packing Unit	Packing Quantity in Carton	Carton L×W×H (mm)
ERTJ0 (0402)	10,000	200,000	250×200×200
ERTJ1 (0603)	4,000	80,000	250×200×200

Part No., quantity and country of origin are designated on outer packages in English.

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Unikeyic Electronics

Global Electronic Components Distributor

Click to view pricing, inventory, delivery, and lifecycle information:

Panasonic:

ERJUP3J112V EVP-AF7B70 ECHU1C103JX5 EEE-FC1E330P EEE-HAA471UAP ERJ3EKF5603V ERJ6GEYJ273V ERJPM8F5364V EEE-FC1A471AP EEE-HA1E470P ERJ-12SF56R0U ERJ-PA3F1332V ERJ2RKF4421X ERJ2RKF5491X ERJPA3F5361V ERJ-P08F1101V ERA-6VRB1001V ERJ-UP3D1203V 25SVPF100M ERJ2RKF6493X 16SVPC100M DK1A-L-12V-F ERA-3KEB1203V ERJ-H3GJ393V ERJ8GEYJ106V ERJB2AF753V ERJPA3F14R0V ECA1CM330B ERJ-P6WF1203V ERJ-U0XJ154Y