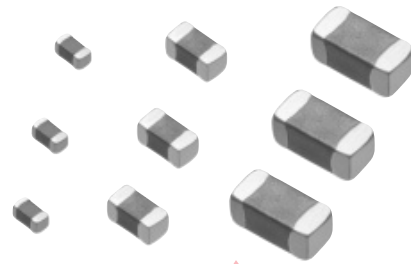


### Multilayer NTC Thermistors

Series: **ERTJ**



#### ■ Features

- Surface Mount Device (0201, 0402, 0603)
- Highly reliable multilayer / monolithic structure
- Wide temperature operating range (-40 to 125 °C)
- Environmentally-friendly lead-free
- RoHS compliant

#### ■ Recommended Applications

- Mobile Phone
  - Temperature compensation for crystal oscillator
  - Temperature compensation for semiconductor devices
- Personal Computer
  - Temperature detection for CPU and memory device
  - Temperature compensation for ink-viscosity (Inkjet Printer)
- Battery Pack
  - Temperature detection of battery cells
- Liquid Crystal Display
  - Temperature compensation of display contrast
  - Temperature compensation of display backlighting (CCFL)

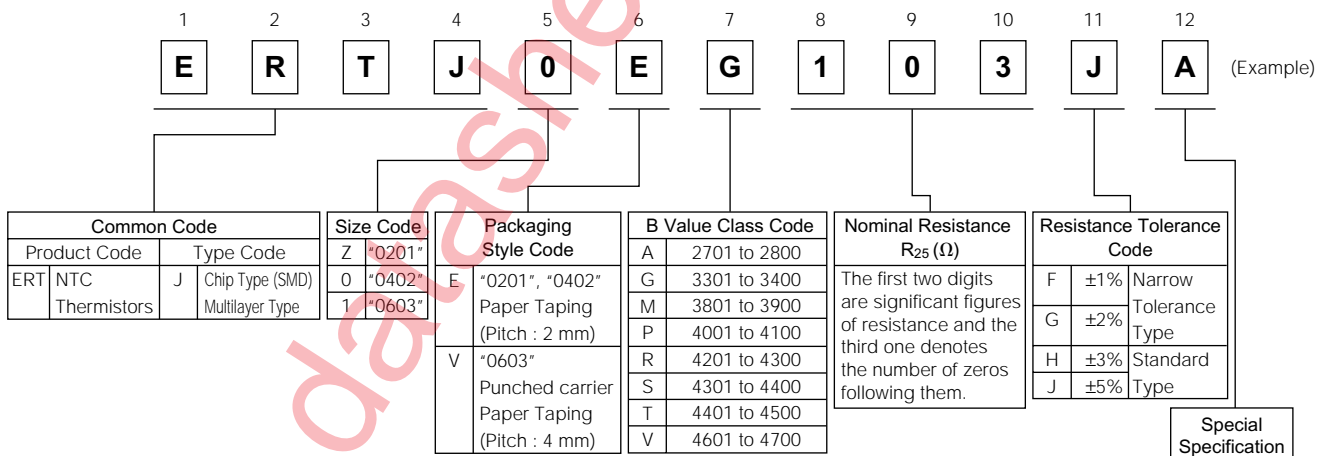
#### ■ Handling Precautions

See Page 155 to 159

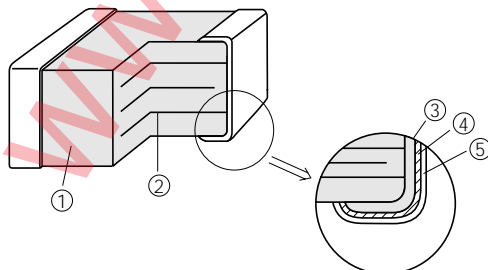
#### ■ Packaging Specifications

See Page 149, 168

#### ■ Explanation of Part Numbers

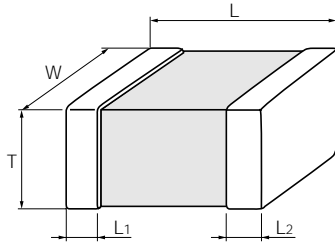


#### ■ Construction



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

### ■ Dimensions in mm (not to scale)



Size Code (EIA)	L	W	T	L <sub>1</sub> , L <sub>2</sub>
Z(0201)	0.60±0.03	0.30±0.03	0.30±0.03	0.15±0.05
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

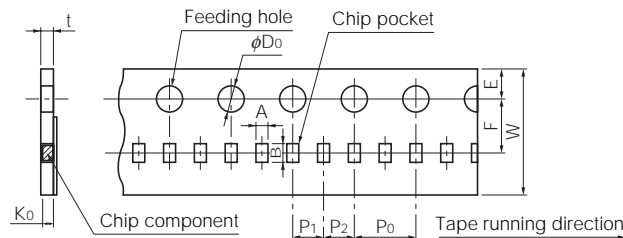
### ■ Packaging Specifications

#### ● Standard Packing Quantities

Size Code	Thickness	Style	Paper taping
Z(0201)	0.3 mm		Pitch 2 mm: 15000 pcs./reel
0(0402)	0.5 mm		Pitch 2 mm: 10000 pcs./reel
1(0603)	0.8 mm		Pitch 4 mm: 4000 pcs./reel

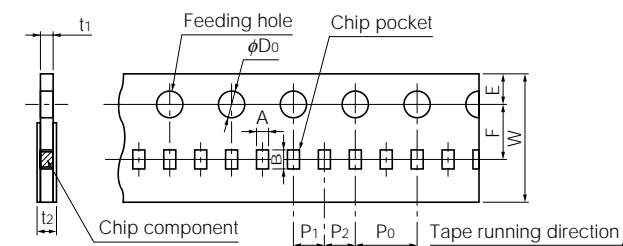
#### ● Paper Taping

Pitch 2 mm (Pressed Carrier taping) : 0201



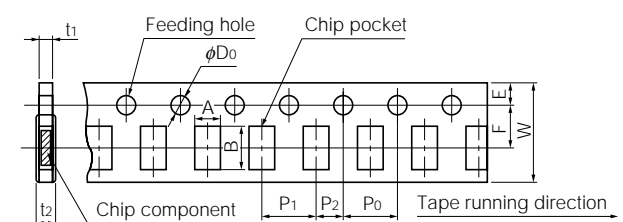
Symbol	A	B	W	F	E	P <sub>1</sub>	P <sub>2</sub>	P <sub>0</sub>	φD <sub>0</sub>	t	K <sub>0</sub>
Dim. (mm)	0.36 ±0.03	0.66 ±0.03	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.0 ±0.1	1.5 <sup>+0.1</sup> <sub>0</sub>	0.55 max.	0.36 ±0.03

Pitch 2 mm (Punched Carrier taping) : 0402



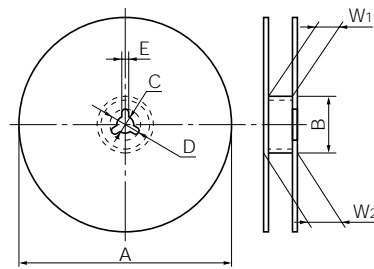
Symbol	A	B	W	F	E	P <sub>1</sub>	P <sub>2</sub>	P <sub>0</sub>	φD <sub>0</sub>	t <sub>1</sub>	t <sub>2</sub>
Dim. (mm)	0.62 ±0.05	1.12 ±0.05	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.0 ±0.1	1.5 <sup>+0.1</sup> <sub>0</sub>	0.7 max.	1.0 max.

Pitch 4 mm (Punched Carrier taping) : 0603



Symbol	A	B	W	F	E	P <sub>1</sub>	P <sub>2</sub>	P <sub>0</sub>	φD <sub>0</sub>	t <sub>1</sub>	t <sub>2</sub>
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 <sup>+0.1</sup> <sub>0</sub>	1.1 max.	1.4 max.

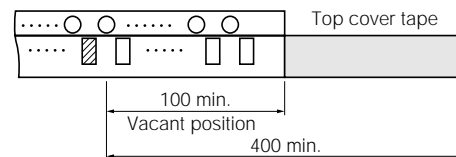
#### ● Reel for Taping



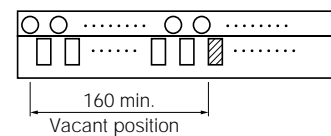
Symbol	φA	φB	C	D	E	W <sub>1</sub>	W <sub>2</sub>
Dim. (mm)	180 <sup>0</sup> <sub>-3</sub>	60.0±0.5	13.0±0.5	21.0±0.8	2.0±0.5	9.0±0.3	11.4±1.0

#### ● Leader Part and Taped End

Leader part



Taped end



(Unit : mm)

### ■ Ratings and Characteristics

Size code (EIA)	Z(0201)	O(0402)	1(0603)
Operating Temperature Range	-40 to 125 °C		
Resistance to Soldering Heat	270 °C-3s, 260 °C-10s		
Dissipation Factor*	approximately 1 mW/°C	approximately 2 mW/°C	approximately 3 mW/°C
Rated Maximum Power Dissipation	33 mW	66 mW	100 mW

\* Reference value when mounted on a glass epoxy board (1.6 mmT)

### ● Resistance ratios to R<sub>25</sub> at each temperature/Reference values

(for obtaining resistance at each temperature by using R<sub>25</sub> shown in part number)

	ERTJ□□A		ERTJ□□G	ERTJ□□M	ERTJ□□P	ERTJ□□R	ERTJ□□S	ERTJ□□T	ERTJ0ET104□	ERTJ□□V
B <sub>25/50</sub>	2750 K	2800 K	(3375 K)	3900 K	4050 K	4250K	(4330K)	4500K	4500K	4700K
B <sub>25/85</sub>	(2700 K)	(2750 K)	3435 K	(3970 K)	(4100 K)	(4300K)	4390K	(4450K)	(4580K)	(4750K)
T(°C)								(*1)	(*2)	
-40	13.05	13.28	20.52	32.11	33.10	43.10	45.53	63.30	47.07	59.76
-35	10.21	10.40	15.48	23.29	24.03	30.45	31.99	42.92	33.31	41.10
-30	8.061	8.214	11.79	17.08	17.63	21.76	22.74	29.50	23.80	28.61
-25	6.427	6.547	9.069	12.65	13.06	15.73	16.35	20.53	17.16	20.14
-20	5.168	5.261	7.037	9.465	9.761	11.48	11.89	14.46	12.49	14.33
-15	4.191	4.261	5.507	7.147	7.362	8.466	8.727	10.30	9.159	10.31
-10	3.424	3.476	4.344	5.444	5.599	6.300	6.469	7.407	6.772	7.482
-5	2.819	2.856	3.453	4.181	4.291	4.730	4.839	5.388	5.046	5.481
0	2.336	2.362	2.764	3.237	3.312	3.582	3.650	3.966	3.789	4.050
5	1.948	1.966	2.227	2.524	2.574	2.734	2.776	2.953	2.864	3.015
10	1.635	1.646	1.806	1.981	2.013	2.102	2.126	2.221	2.179	2.262
15	1.380	1.386	1.474	1.567	1.584	1.629	1.641	1.687	1.669	1.710
20	1.171	1.174	1.211	1.247	1.255	1.272	1.276	1.293	1.287	1.303
25	1	1	1	1	1	1	1	1	1	1
30	0.8585	0.8565	0.8309	0.8072	0.8016	0.7921	0.7890	0.7799	0.7823	0.7734
35	0.7407	0.7372	0.6941	0.6556	0.6461	0.6315	0.6266	0.6131	0.6158	0.6023
40	0.6422	0.6376	0.5828	0.5356	0.5235	0.5067	0.5007	0.4856	0.4876	0.4721
45	0.5595	0.5541	0.4916	0.4401	0.4266	0.4090	0.4025	0.3874	0.3884	0.3723
50	0.4899	0.4836	0.4165	0.3635	0.3496	0.3319	0.3254	0.3111	0.3111	0.2954
55	0.4309	0.4238	0.3543	0.3018	0.2881	0.2709	0.2645	0.2513	0.2504	0.2356
60	0.3806	0.3730	0.3027	0.2518	0.2386	0.2222	0.2161	0.2042	0.2026	0.1889
65	0.3376	0.3295	0.2595	0.2111	0.1985	0.1832	0.1774	0.1670	0.1648	0.1523
70	0.3008	0.2922	0.2233	0.1777	0.1659	0.1518	0.1465	0.1377	0.1348	0.1236
75	0.2691	0.2600	0.1929	0.1504	0.1393	0.1264	0.1215	0.1144	0.1108	0.1009
80	0.2417	0.2322	0.1672	0.1278	0.1174	0.1057	0.1013	0.09560	0.09162	0.08284
85	0.2180	0.2081	0.1451	0.1090	0.09937	0.08873	0.08486	0.08033	0.07609	0.06834
90	0.1974	0.1871	0.1261	0.09310	0.08442	0.07468	0.07138	0.06782	0.06345	0.05662
95	0.1793	0.1688	0.1097	0.07980	0.07200	0.06307	0.06028	0.05753	0.05314	0.04712
100	0.1636	0.1528	0.09563	0.06871	0.06166	0.05353	0.05112	0.04903	0.04472	0.03939
105	0.1498	0.1387	0.08357	0.05947	0.05306	0.04568	0.04351	0.04198	0.03784	0.03308
110	0.1377	0.1263	0.07317	0.05170	0.04587	0.03918	0.03718	0.03609	0.03218	0.02791
115	0.1270	0.1153	0.06421	0.04512	0.03979	0.03374	0.03188	0.03117	0.02748	0.02364
120	0.1175	0.1056	0.05650	0.03951	0.03460	0.02916	0.02742	0.02702	0.02352	0.02009
125	0.1091	0.09695	0.04986	0.03470	0.03013	0.02527	0.02367	0.02351	0.02017	0.01712

(\*1) Other than ERTJ0ET104□ in B<sub>25/50</sub>=4500K.

(\*2) ERTJ0ET104□ only.

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

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

R<sub>25</sub>=Resistance at 25.0±0.1 °C  
 R<sub>50</sub>=Resistance at 50.0±0.1 °C  
 R<sub>85</sub>=Resistance at 85.0±0.1 °C

■ Part Number List of Narrow Tolerance Type (Resistance Tolerance :  $\pm 2\%$ ,  $\pm 1\%$ )

● 0402(EIA)

Nominal Resistance at 25 °C	Resistance Tolerance	B value class code		G	V
		Nominal B value *( ) Reference value	B <sub>25/50</sub> B <sub>25/85</sub>	(3375 K) 3435 K $\pm 1\%$	4700 K $\pm 1\%$ (4750 K)
10 k $\Omega$	$\pm 1\%$ (F)			ERTJ0EG103□A	
100 k $\Omega$	$\pm 2\%$ (G) or $\pm 1\%$ (F)				ERTJ0EV104□

□ : Resistance Tolerance Code  
Avoid flow soldering.

● 0603(EIA)

Nominal Resistance at 25 °C	Resistance Tolerance	B value class code		G	S
		Nominal B value *( ) Reference value	B <sub>25/50</sub> B <sub>25/85</sub>	(3375 K) 3435 K $\pm 1\%$	(4330 K) 4390 K $\pm 1\%$
10 k $\Omega$	$\pm 1\%$ (F)			ERTJ1VG103□A	
100 k $\Omega$	$\pm 2\%$ (G) or $\pm 1\%$ (F)				ERTJ1VS104□A

□ : Resistance Tolerance Code  
Avoid flow soldering.

### ■ Part Number List of Standard Type (Resistance Tolerance : $\pm 5\%$ , $\pm 3\%$ )

#### ● 0201(EIA)

Nominal Resistance at 25 °C	Resistance Tolerance	B value class code		G	P	T	V
		Nominal B value *( $\emptyset$ ) Reference value	B <sub>25/50</sub> B <sub>25/85</sub>	(3375 K) 3435 K $\pm 2\%$	4050 K $\pm 3\%$ (4100 K)	4500 K $\pm 2\%$ (4450 K)	4700 K $\pm 2\%$ (4750 K)
2 k $\Omega$	$\pm 3\%$ (H) or $\pm 5\%$ (J)					ERTJZET202 $\square$	
3 k $\Omega$						ERTJZET302 $\square$	
10 k $\Omega$				ERTJZEG103 $\square$ A			
47 k $\Omega$					ERTJZEP473 $\square$		
100 k $\Omega$							ERTJZEV104 $\square$

$\square$  : Resistance Tolerance Code  
Avoid flow soldering.

#### ● 0402(EIA)

Nominal Resistance at 25 °C	Resistance Tolerance	B value class code		A		G	M
		Nominal B value *( $\emptyset$ ) Reference value	B <sub>25/50</sub> B <sub>25/85</sub>	2750 K $\pm 3\%$ (2700 K)	2800 K $\pm 3\%$ (2750 K)	(3375 K) 3435 K $\pm 1\%$	3900 K $\pm 2\%$ (3970 K)
22 $\Omega$	$\pm 3\%$ (H) or $\pm 5\%$ (J)			ERTJ0EA220 $\square$			
33 $\Omega$				ERTJ0EA330 $\square$			
40 $\Omega$				ERTJ0EA400 $\square$			
47 $\Omega$				ERTJ0EA470 $\square$			
68 $\Omega$					ERTJ0EA680 $\square$		
100 $\Omega$					ERTJ0EA101 $\square$		
150 $\Omega$					ERTJ0EA151 $\square$		
10 k $\Omega$						ERTJ0EG103 $\square$ A	ERTJ0EM103 $\square$

Nominal Resistance at 25 °C	Resistance Tolerance	B value class code		P	R	T	V
		Nominal B value *( $\emptyset$ ) Reference value	B <sub>25/50</sub> B <sub>25/85</sub>	4050 K $\pm 2\%$ (4100 K)	4250 K $\pm 2\%$ (4300 K)	4500 K $\pm 2\%$ (4450 K, 4580 K)	4700 K $\pm 2\%$ (4750 K)
1.0 k $\Omega$	$\pm 3\%$ (H) or $\pm 5\%$ (J)					ERTJ0ET102 $\square$	
1.5 k $\Omega$						ERTJ0ET152 $\square$	
2.0 k $\Omega$						ERTJ0ET202 $\square$	
2.2 k $\Omega$						ERTJ0ET222 $\square$	
3.0 k $\Omega$						ERTJ0ET302 $\square$	
3.3 k $\Omega$					ERTJ0ER332 $\square$	ERTJ0ET332 $\square$	
4.7 k $\Omega$					ERTJ0ER472 $\square$	ERTJ0ET472 $\square$	
6.8 k $\Omega$					ERTJ0ER682 $\square$		
10 k $\Omega$					ERTJ0ER103 $\square$		
15 k $\Omega$					ERTJ0ER153 $\square$		
22 k $\Omega$					ERTJ0ER223 $\square$		
33 k $\Omega$					ERTJ0ER333 $\square$		
47 k $\Omega$				ERTJ0EP473 $\square$			ERTJ0EV473 $\square$
68 k $\Omega$							ERTJ0EV683 $\square$
100 k $\Omega$						ERTJ0ET104 $\square$	ERTJ0EV104 $\square$
150 k $\Omega$							ERTJ0EV154 $\square$
220 k $\Omega$							ERTJ0EV224 $\square$
330 k $\Omega$							ERTJ0EV334 $\square$
470 k $\Omega$							ERTJ0EV474 $\square$

$\square$  : Resistance Tolerance Code  
Avoid flow soldering.

● 0603(EIA)

Nominal Resistance at 25 °C	Resistance Tolerance	B value class code		A		G	P
		Nominal B value *( $\square$ ) Reference value	B <sub>25/50</sub> B <sub>25/85</sub>	2750 K $\pm$ 3 % (2700 K)	2800 K $\pm$ 3 % (2750 K)	(3375 K) 3435 K $\pm$ 1 %	4050 K $\pm$ 3 % (4100 K)
22 $\Omega$	±3 % (H) or ±5 % (J)			ERTJ1VA220 $\square$			
33 $\Omega$				ERTJ1VA330 $\square$			
40 $\Omega$					ERTJ1VA400 $\square$		
47 $\Omega$					ERTJ1VA470 $\square$		
68 $\Omega$					ERTJ1VA680 $\square$		
100 $\Omega$					ERTJ1VA101 $\square$		
10 k $\Omega$						ERTJ1VG103 $\square$ A	
47 k $\Omega$							ERTJ1VP473 $\square$

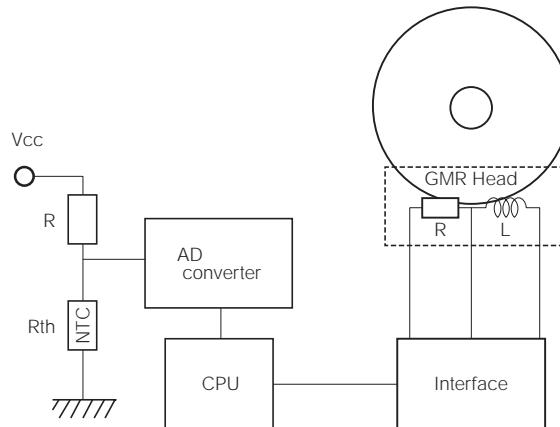
Nominal Resistance at 25 °C	Resistance Tolerance	B value class code		R	S	T	V
		Nominal B value *( $\square$ ) Reference value	B <sub>25/50</sub> B <sub>25/85</sub>	4250 K $\pm$ 2 % (4300 K)	(4330 K) 4390 K $\pm$ 1%	4500 K $\pm$ 2 % (4450 K)	4700 K $\pm$ 2 % (4750 K)
1.0 k $\Omega$	±3 % (H) or ±5 % (J)					ERTJ1VT102 $\square$	
1.5 k $\Omega$						ERTJ1VT152 $\square$	
2.0 k $\Omega$						ERTJ1VT202 $\square$	
2.2 k $\Omega$						ERTJ1VT222 $\square$	
3.0 k $\Omega$						ERTJ1VT302 $\square$	
3.3 k $\Omega$					ERTJ1VR332 $\square$		ERTJ1VT332 $\square$
4.7 k $\Omega$					ERTJ1VR472 $\square$		ERTJ1VT472 $\square$
6.8 k $\Omega$					ERTJ1VR682 $\square$		
10 k $\Omega$					ERTJ1VR103 $\square$		
15 k $\Omega$					ERTJ1VR153 $\square$		
22 k $\Omega$					ERTJ1VR223 $\square$		
33 k $\Omega$					ERTJ1VR333 $\square$		
47 k $\Omega$					ERTJ1VR473 $\square$		ERTJ1VV473 $\square$
68 k $\Omega$					ERTJ1VR683 $\square$		ERTJ1VV683 $\square$
100 k $\Omega$						ERTJ1VS104 $\square$ A	ERTJ1VV104 $\square$
150 k $\Omega$							ERTJ1VV154 $\square$

$\square$  : Resistance Tolerance Code  
Avoid flow soldering.

### ■ Typical Application

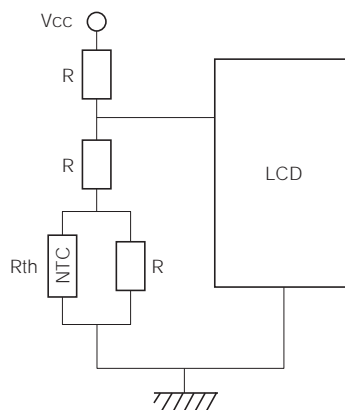
- Temperature Detection

Writing current control of HDD



- Temperature Compensation (Pseudo-linearization)

Contrast level control of LCD



- Temperature Compensation (RF circuit)

Temperature compensation of TCXO

