

THIN FILM PRECISION CHIP RESISTOR

TYPE RP73 SERIES

INTRODUCTION

TE Connectivity's RP73 Series Thin Film Precision Chip Resistors are engineered for high-accuracy electronic applications requiring superior stability, tight tolerance, and minimal temperature drift. Manufactured using advanced thin film processes, the RP73 family achieves tolerance grades as low as $\pm 0.01\%$ and TCR values down to $\pm 1\text{ppm}/^{\circ}\text{C}$. The wide resistance range, broad size options, and strong environmental endurance make the RP73 Series suitable for high reliability segments including instrumentation, industrial control, and high-performance communication systems. With proven reliability under biased humidity, AEC-Q200 compliance (excluding RP730402), and robust environmental performance, the RP73 Series is well suited for Applications demanding dependable performance in precision critical design.



By delivering a unique balance of ultra-high precision, exceptional thermal stability, compact footprint, and proven reliability, the RP73 Series has become a preferred choice for engineers developing next-generation electronic systems where every resistance value matters and long-term performance cannot be compromised.

FEATURES

- Advanced thin film technology
- Very tight tolerance down to $\pm 0.01\%$
- Extremely low TCR down to $\pm 1\text{PPM}/^{\circ}\text{C}$
- Wide resistance range $1\ \Omega \sim 3\ \text{M}\Omega$
- Miniature size RP730402 available
- AEC-Q200-compliance (RP730402 product is excluded)
- Test proven immunity to Biased humidity($85^{\circ}\text{C}/85\% \text{ RH}$)

APPLICATIONS

- Medical diagnostics and monitoring equipment
- Test and measurement instrumentation
- Printer and imaging systems
- Industrial and automation controllers
- Power conversion and regulation circuits
- Consumer and communications electronics such as mobile devices and GPS modules

ELECTRICAL CHARACTERISTICS

Type		RP730402	RP730603	RP730805	RP731206	RP731210	RP732010	RP732512
Power Rating at 70°C		0.063W	0.063W	0.1W	0.125W	0.25W	0.25W	0.5W
Operating Temp. Range		-55°C~+155°C						
Max. Working Voltage		50V	50V	100V	150V	150V	150V	150V
Max. Overload Voltage		100V	100V	200V	300V	300V	300V	300V
Resistance Range	±0.05%	49.9Ω - 12kΩ	4.7Ω - 332kΩ	4.7Ω - 1MΩ	1Ω - 1MΩ	1Ω - 1MΩ	1Ω - 1MΩ	4.7Ω - 1MΩ
	±0.1%	4Ω - 511kΩ	1Ω - 1MΩ	1Ω - 2MΩ	1Ω - 3MΩ	1Ω - 3MΩ	1Ω - 3MΩ	1Ω - 3MΩ
TCR (PPM/°C)		±25 ±50						

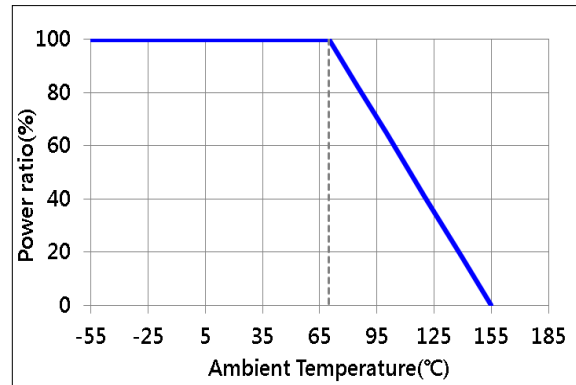
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ENVIRONMENTAL CHARACTERISTICS

Characteristics	Standards		Test Methods
	Tol. ≤ 0.05%	Tol. > 0.05%	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		+25/-55/+25/+125/+25°C MIL-STD-202 Method 304
Short Time Overload	R±0.05%	ΔR±0.1%; ΔR ±0.2% for RP730402	RCWV*2.5 or Max overload whichever is lower for 5 seconds JIS-C-5201-1 4.13
	R±0.2% for Ultra high power rating		
Insulation Resistance	>9999 MΩ		Apply 100V _{DC} for 1 minute MIL-STD-202 Method 302
Endurance	ΔR±0.05%	ΔR±0.1%	70±2°C, RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF” MIL-STD-202 Method 108A
	ΔR±0.5% for Ultra high power rating		
	RP730402: ≤ 7kΩ →ΔR±0.2%		
Bending Strength	ΔR±0.05%	ΔR±0.1%	Bending amplitude 3mm for 60 seconds RP732010 RP732512 sizes: 2 mm Other sizes: 3 mm JIS-C-5201-1 4.33
Damp Heat with Load (RP730402)	ΔR±0.3%		40±2°C, 90-95% R.H. RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF” MIL-STD-202 Method 103B
Solderability	95% min coverage		245±5°C for 3 seconds MIL-STD-202 Method 208H
Resistance to Soldering Heat	ΔR±0.05%	ΔR±0.1%	260±5°C for 10 seconds MIL-STD-202 Method 210E
Dielectric Withstand Voltage	By Type		Max. overload voltage for 1 minute MIL-STD-202 Method 301
Low Temperature Operation	ΔR±0.05%	ΔR±0.2%	1 hour, -65°C, followed by 45 minutes of RCWV JIS-C-5201-1 4.36
	ΔR±0.5% for high power & Ultra Power rating		
High Temperature Exposure	ΔR±0.5% RP730402 TO RP732512 ≤ 1.01M ΔR±0.2% for the other		at +155°C for 1000 hrs MIL-STD-202 Method 108
Temperature Cycling	ΔR±0.2% (RP730402 product is excluded)		-55°C to +125°C, 1000 cycles JESD22 Method JA-104
ESD	ΔR±0.5% (RP730402 product is excluded)		Human body model RP730402 RP730603 200V RP730805 RP731206 1000V RP732010 RP732512 RP731210 2000V AEC-Q200-002
Sulfur Test	ΔR±2% (RP730402 product is excluded)		Modified 105 ±2°C no power rating for 1000 hrs ASTM-B-809-95
Biased Humidity	ΔR±0.1% (RP730402 product is excluded)		1000 hrs 85 °C/85%RH 10% of operating power MIL-STD-202 Method 103

DERATING CURVE



VOLTAGE RATING

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial- line frequency and waveform corresponding to the power rating, as determined from the following formula:

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

Note:

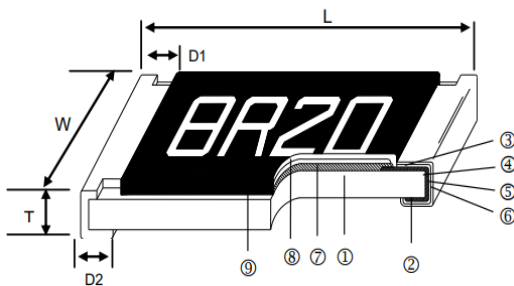
1. Max. working voltage or $\sqrt{P \times R}$ whichever is lower
2. Max. overload voltage or $2.5 \sqrt{P \times R}$ whichever is lower

Where : RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volts) and

P = Power Rating (watt)

R = Nominal Resistance (ohm)

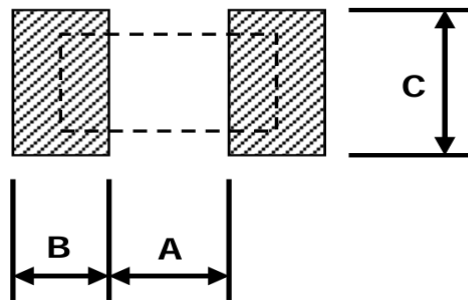
CONSTRUCTION AND DIMENSIONS (Unit: mm)



1	Alumina Substrate	4	Edge Electrode	7	Resistor Layer
2	Bottom Electrode	5	Barrier Layer	8	Overcoat
3	Top Electrode	6	External Electrode	9	Marking

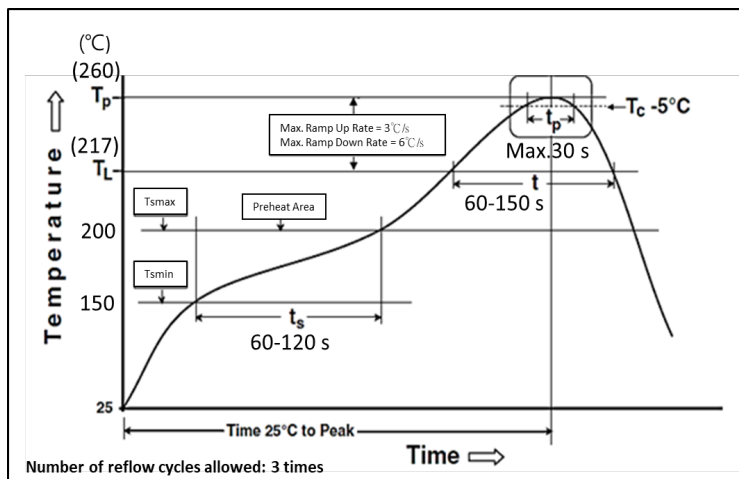
Type	Size (Inch)	L (mm)	W (mm)	T (mm)	D ₁ (mm)	D ₂ (mm)	Weight (g) (1000pcs)
RP730402	0402	1.00±0.05	0.50±0.05	0.30±0.05	0.20±0.15	0.20±0.10	0.54
RP730603	0603	1.55±0.10	0.80±0.10	0.45±0.10	0.30±0.25	0.30±0.20	1.83
RP730805	0805	2.00±0.15	1.25±0.10	0.50±0.10	0.30±0.25	0.40±0.20	4.71
RP731206	1206	3.05±0.15	1.55±0.10	0.55±0.10	0.42±0.30	0.35±0.25	9.02
RP731210	1210	3.10±0.15	2.40±0.10	0.55±0.10	0.40±0.30	0.55±0.25	10
RP732010	2010	4.90±0.15	2.40±0.10	0.55±0.10	0.60±0.40	0.50±0.25	23.61
RP732010(0.5W)	2010(0.5W)	4.90±0.15	2.40±0.10	0.55±0.10	0.60±0.40	2.20±0.25	26.68
RP732510	2512	6.30±0.15	3.10±0.15	0.55±0.10	0.60±0.40	0.50±0.25	38.06
RP732010(1W)1-100Ω	2512(1W)	6.30±0.15	3.10±0.15	0.55±0.10	0.60±0.40	0.50±0.25	44.65
RP732512(1W)101Ω above	2512(1W)	6.30±0.15	3.10±0.15	0.55±0.10	0.60±0.40	2.50±0.25	44.65

RECOMMENDED PCB LAYOUT PLAN (Unit: mm)



Type	A (mm)	B (mm)	C (mm)
RP730402	0.50	0.5	0.60±0.2
RP730603	0.80	1.00	0.90±0.2
RP730805	1.00	1.00	1.35±0.2
RP731206	2.00	1.15	1.70±0.2
RP731210	2.00	1.15	2.50±0.2
RP732010	3.60	1.40	2.50±0.2
RP732010(0.5W)	1.00	2.70	2.50±0.2
RP732512	4.90	1.60	3.10±0.2
RP732512(1W) 1-100Ω	4.90	1.60	3.10±0.2
RP732512(1W) 101Ω above	1.00	3.55	3.10±0.2

SOLDERING PROFILE

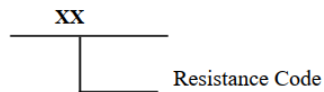


Reflow Profiles	
Profile Feature	Pb-Free Assembly
Preheat Min. Temperature (T _{min})Max Temperature (T _{max}) Preheating time (t _s) from (T _{min} to T _{max})	150°C 200°C 60-120 seconds
Ramp-up rate (T _L to T _p)	3°C/second max.
Liquidous temperature (T _L) Time (t _L) maintained above T _L	217 °C 60-150 seconds
Min. Peak temperature (T _p min)	235°C
Max. Peak temperature (T _p max)	260°C
Time (t _p) within 5 °C of the specified classification temperature (T _c)	30 seconds max.
Ramp-down rate (T _p to T _L)	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

MULTIPLIER CODE

Code	A	B	C	D	E	F	G	H	X	Y	Z
Multiplier	10^0	10^1	10^2	10^3	10^4	10^5	10^6	10^7	10^{-1}	10^{-2}	10^{-3}

Coding



Formula



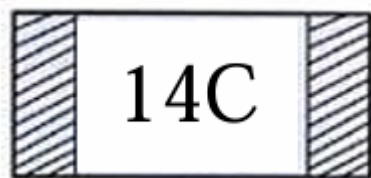
Example :

$$10.2K\Omega = \begin{matrix} 102 \\ \downarrow \\ 02 \end{matrix} \times \begin{matrix} 2 \\ 10\Omega \\ \downarrow \\ C \end{matrix} = 02C$$

$$33.2\Omega = \begin{matrix} 332 \\ \downarrow \\ 51 \end{matrix} \times \begin{matrix} -1 \\ 10\Omega \\ \downarrow \\ X \end{matrix} = 51X$$

Value	Code	Value	Code	Value	Code	Value	Code	Value	Code
100	01	162	21	261	41	422	61	681	81
102	02	165	22	267	42	432	62	698	82
105	03	169	23	274	43	442	63	715	83
107	04	174	24	280	44	453	64	732	84
110	05	178	25	287	45	464	65	750	85
113	06	182	26	294	46	475	66	768	86
115	07	187	27	301	47	487	67	787	87
118	08	191	28	309	48	499	68	806	88
121	09	196	29	316	49	511	69	825	89
124	10	200	30	324	50	523	70	845	90
127	11	205	31	332	51	536	71	866	91
130	12	210	32	340	52	549	72	887	92
133	13	215	33	348	53	562	73	909	93
137	14	221	34	357	54	576	74	931	94
140	15	226	35	365	55	590	75	953	95
143	16	232	36	374	56	604	76	976	96
147	17	237	37	383	57	619	77		
150	18	243	38	392	58	634	78		
154	19	249	39	402	59	649	79		
158	20	255	40	412	60	665	80		

MARKING



**3 digit marking
for Example:**

14C=13K7Ω 13C=13K3Ω
68B=4K99Ω 68X=49.9Ω

Code	A	B	C	D	E	F	G	H	X	Y	Z
Multiplier	10 ⁰	10 ¹	10 ²	10 ³	10 ⁴	10 ⁵	10 ⁶	10 ⁷	10 ⁻¹	10 ⁻²	10 ⁻³

RP730603 3 digit marking for E24 (RP73) Example:

101=100Ω 102=1KΩ

E24	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47	51	56	62	68	75	82	91
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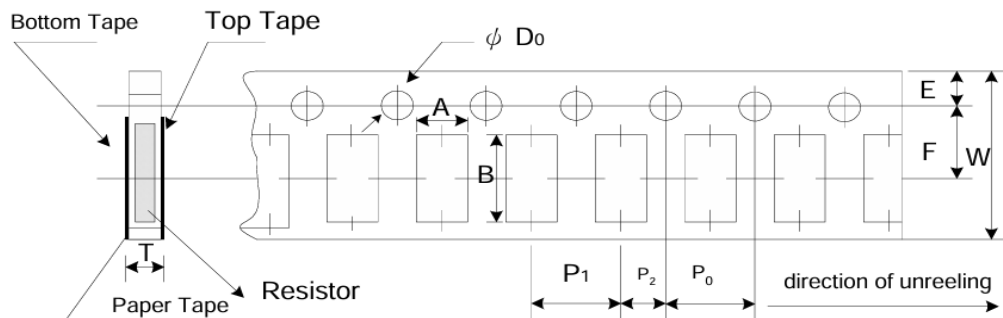
Code	E96	Code	E96	Code	E96	Code	E96
01	100	25	178	49	316	73	562
02	102	26	182	50	324	74	576
03	105	27	187	51	332	75	590
04	107	28	191	52	340	76	604
05	110	29	196	53	348	77	619
06	113	30	200	54	357	78	634
07	115	31	205	55	365	79	649
08	118	32	210	56	374	80	665
09	121	33	215	57	383	81	681
10	124	34	221	58	392	82	698
11	127	35	226	59	402	83	715
12	130	36	232	60	412	84	732
13	133	37	237	61	422	85	750
14	137	38	243	62	432	86	768
15	140	39	249	63	442	87	787
16	143	40	255	64	453	88	806
17	147	41	261	65	464	89	825
18	150	42	267	66	475	90	845
19	154	43	274	67	487	91	866
20	158	44	280	68	499	92	887
21	162	45	287	69	511	93	909
22	165	46	294	70	523	94	931
23	169	47	301	71	536	95	953
24	174	48	309	72	549	96	976

RP730805 ~ RP732512 4 digit marking for E24 (RP73) Example:

Resistance	100Ω	2.2KΩ	10KΩ	49.9KΩ	100KΩ
Marking	1000	2201	1002	4992	1003

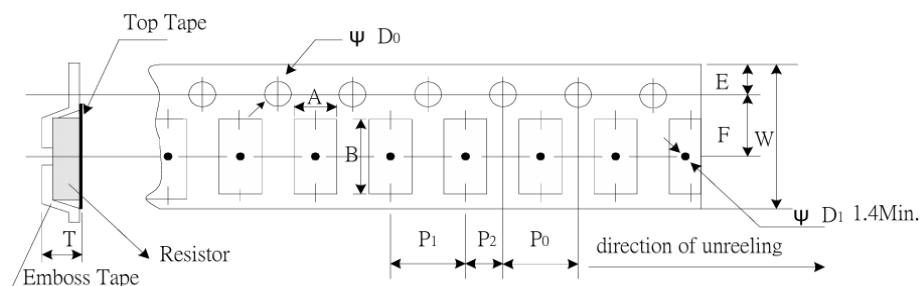
PACKING SPECIFICATION

PAPER TAPING DIMENSIONS (Unit:mm)



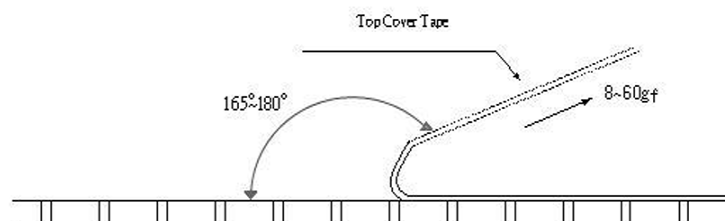
Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
RP730402	0.70±0.05	1.16±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.55±0.05	0.40±0.03
RP730603	1.10±0.05	1.90±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.60±0.03
RP730805	1.60±0.05	2.37±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
RP731206	2.00±0.05	3.55±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
RP731210	2.75±0.05	3.40±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.60±0.10	0.75±0.05

EMBOSSED TAPING DIMENSIONS (Unit:mm)



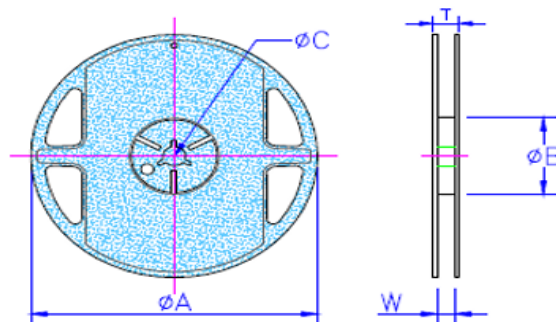
Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
RU732512	3.40±0.10	6.65±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50±0.10	1.00±0.20

PEELING STRENGTH OF TOP COVER TAPE





REEL DIMENSION (Unit:mm)



Type	ØA	ØB	ØC	W	T	Paper Tape (EA)	Embossed Plastic Tape (EA)
RP730402	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
RP730603	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
RP730805	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
RP731206	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
RP731210	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
RP732010	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
RP732512	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000

ENVIRONMENT RELATED SUBSTANCE

This product complies with the applicable requirements of the EU RoHS Directive, EU PAHs requirements, EU PFOS requirements, and halogen-free material expectations. Ozone-depleting substances are not used in the manufacturing process for this product. This product is not manufactured using chlorofluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs), hydrobromofluorocarbons (HBFCs), or other ozone-depleting substances at any stage of manufacture.

STORAGE CONDITION (MSL1)

The performance of these products, including solderability, is guaranteed for two years from the date of arrival at the customer location, provided the products remain in the original delivered packaging and are stored at 15 ~ 28°C and a relative humidity of < 80%RH. Even within this period, the products should not be stored under conditions that may adversely affect electrical performance, solderability, or packaging integrity.

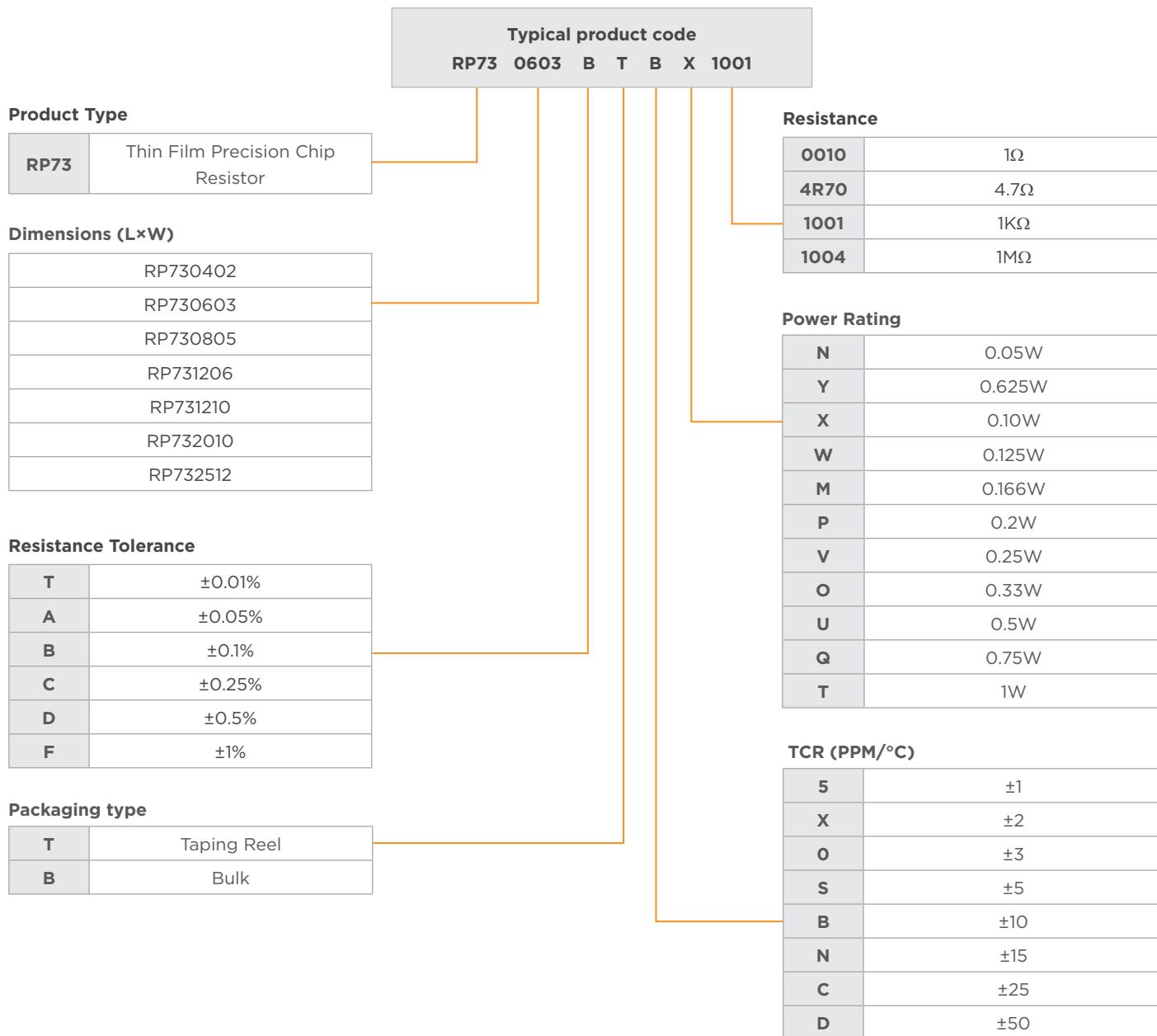
1. In salty air or in atmospheres containing corrosive gases such as Cl₂, H₂S, NH₃, SO₂, or NO₂.
2. In direct sunlight

Thin Film Precision Chip Resistor

Type RP73 Series

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ORDERING INFORMATION



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