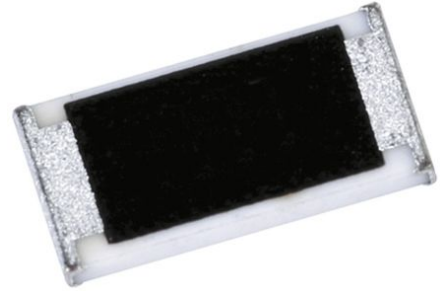


# Anti Surge SMD Resistor

## Features

- Small size and light weight
- High-Precision, high-power, anti-pulse
- Suitable for both wave and reflow soldering
- ESD surge characteristics superior to standard metal film resistors
- RoHS compliant



## Application

AV adapter, LCD back-light, camera flash, etc

## PART NUMBER

Example: RND 155PS03W4F1000T5E

RND 155PS03	W4	F	1000	T	5	E
Type	Wattage	Tolerance	Resistance Value	Packing Type	Packing Quantity	Special Feature
RND 155PS03: 0603 RND 155PS05: 0805 RND 155PS06: 1206	<b>Normal size:</b> W2=1/2W W3=1/3W W4=1/4W	J ~ ± 5% F ~ ± 1% D ~ ± 0.5%	E24 series: the 1st digit is "0" the 2nd & 3rd digits are for the significant figures of the resistance and the 4th indicate the number of zeros following: Decimal point is expressed: "J"~0.1,"K"~0.01,"L"~0.001,"M" ~ 0.0001,"N"~0.00001  Ex: 0Ω005 ~50M, 0Ω075 ~75L  E96 series: the 1st digit to 3rd digit are for the significant figures of the resistance and the 4th indicate the number of zeros	T=T/R Packing	5=5000 pcs	E= Lead(pb) Free Plating Type / RoHS compliant

## Scope:

This specification for approval relates to Anti-Surge Thick Film Chip Resistors (Lead Free) manufactured by RND.

## Ratings:

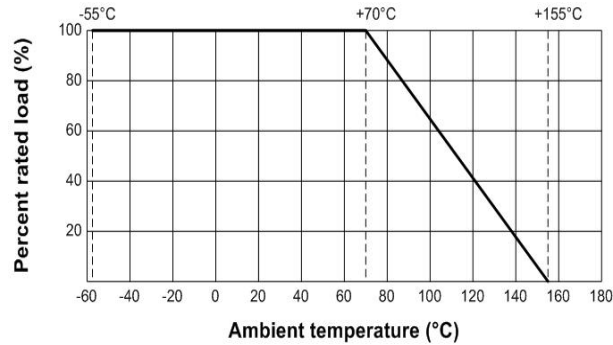
Type	RND 155PS03	RND 155PS05	RND 155PS06
Power Rating	1/4W	1/3W	1/2W
Max. Working Voltage	50 V	150 V	200 V
Max. Overload Voltage	100 V	300 V	400 V
Dielectric Withstanding Voltage	300 V	500 V	500 V
Temperature Range	-55°C ~ +155°C		
Ambient Temperature	70 °C		

# Anti Surge SMD Resistor

## Power rating

Resistors shall have a power rating based on continuous load operation at an ambient temperature of 70 °C .  
For temperature in excess of 70 °C , The load shall be derate as shown in figure 1.

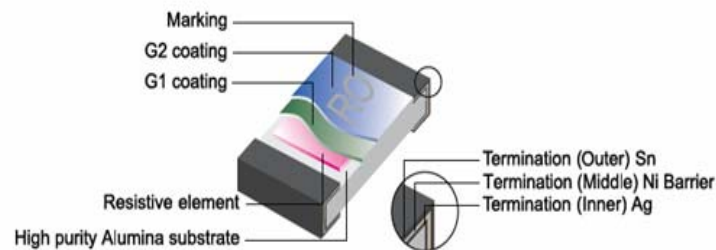
Figure 1



## Nominal Resistance

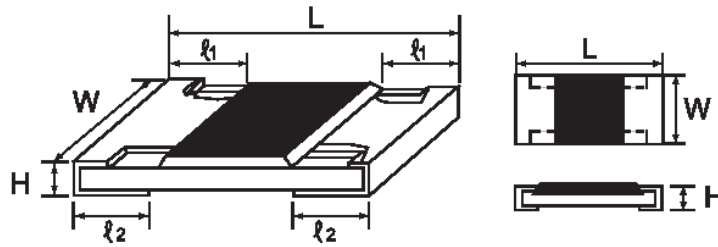
Effective figures of nominal resistance shall be in accordance with E-24 and E-96 series  
E-96 series for 1 % and E-24 series for 5 %

## Construction



# Anti Surge SMD Resistor

## Power rating and dimensions



Type	Dimension (mm)				
	L	W	H	l1	l2
RND 155PS03	1.60 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
RND 155PS05	2.00 ± 0.15	1.25 + 0.15 - 0.10	0.55 ± 0.10	0.40 ± 0.20	0.40 ± 0.20
RND 155PS06	3.10 ± 0.15	1.55 + 0.15 - 0.10	0.55 ± 0.10	0.45 ± 0.20	0.45 ± 0.20

## Power Rating :

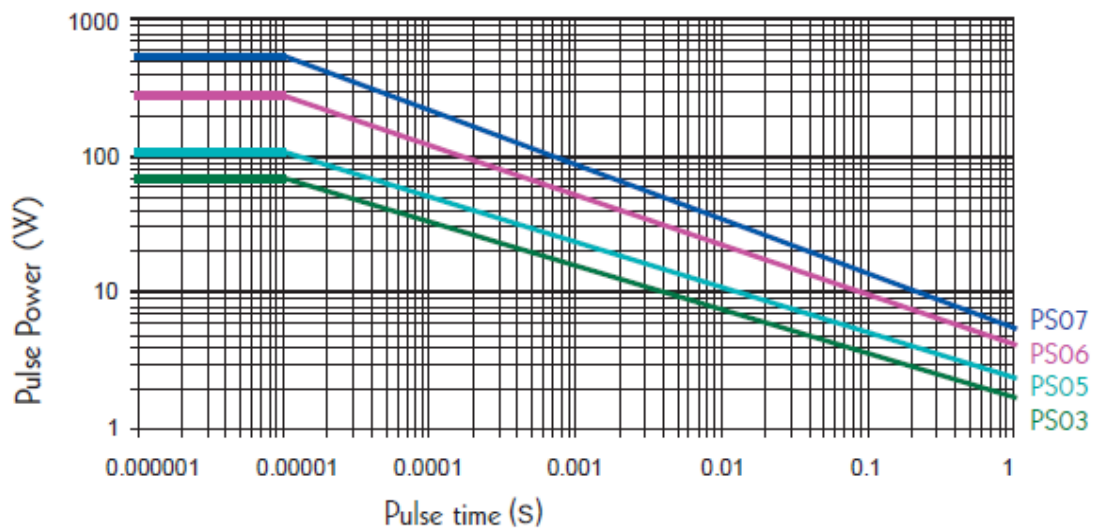
Type	Power Rating at 70	Tolerance	Resistance Range	Standard Series
RND 155PS03	1/4W	± 0.5%	1Ω~10MΩ	E-96
		± 1%		E-96
		± 5%		E-24
RND 155PS05	1/3W	± 0.5%	1Ω~10MΩ	E-96
		± 1%		E-96
		± 5%		E-24
RND 155PS06	1/2W	± 0.5%	1Ω~10MΩ	E-96
		± 1%		E-96
		± 5%		E-24

# Anti Surge SMD Resistor



## Pulse withstand capacity

The single impulse graph is the result of 50 impulses of rectangular shape applied at one-minute intervals. The limit of acceptance was a shift in resistance of less than 1% from the initial value. The power applied was subject to the restrictions of the maximum permissible impulse voltage graph shown.



# Anti Surge SMD Resistor



## Mutiplier Code :

Code	A	B	C	D	E	F	G	H	X	Y	Z
	<sup>0</sup>	<sup>1</sup>	<sup>2</sup>	<sup>3</sup>	<sup>4</sup>	<sup>5</sup>	<sup>6</sup>	<sup>7</sup>	<sup>-1</sup>	<sup>-2</sup>	<sup>-3</sup>
Multiplier	10	10	10	10	10	10	10	10	10	10	10

### Coding

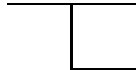
XX



Resistance Code

### Formula

X



Multiplier Code

### Example :

$$10.2K\Omega = \underset{02}{102} \times \underset{C}{10} \Omega = 02C$$

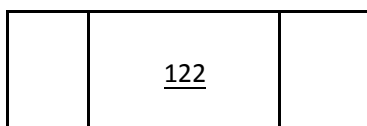
$$33.2\Omega = \underset{51}{332} \times \underset{X}{10}^{-1} \Omega = 51X$$

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 for PS03 E-96 series, the resistance value that no have multiplier code indicate marking follow this:

The first two digits are significant figures of resistance and the third one denoted number of zeros and under line the marking letters.

Ex.



1.2KΩ

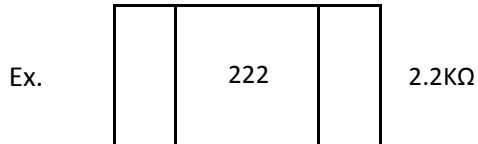
# Anti Surge SMD Resistor



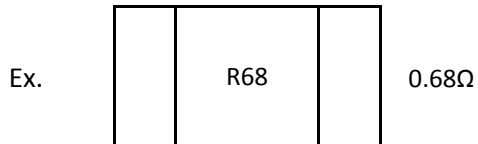
## Marking:

Marking for E-24 series in RND 155PS03, RND 155PS05, RND 155PS06 size: 3 Digits

\*The first 2 digits are significant figures of resistance and the 3rd digit denoted number of zeros.

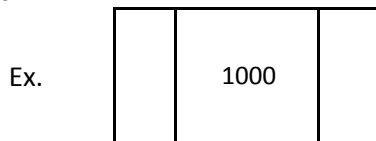


\*For ohmic values below 10  $\Omega$ , letter "R" is for decimal point.

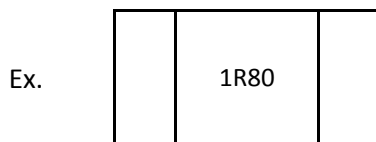


B. Marking for E-96 series in PS05, PS06, PS07 size : 4 Digits

\*The first 3 digits are significant figures of resistance and the 4th digit denoted number of zeros.



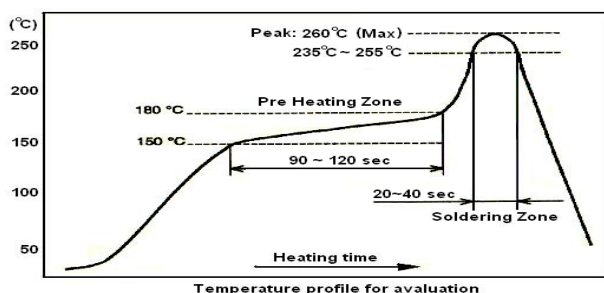
\*For ohmic values below 100  $\Omega$ , letter "R" is for decimal point.



# Anti Surge SMD Resistor



## Performance specification :

Characteristics	Limits	Test Methods ( JIS C 5201-1 )
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down	4.7 Clamped in the trough of a 90°C metallic v-block and shall be tested at ac potential respectively specified in the type for 60-70 seconds
Temperature Coefficient	1Ω~10Ω : ± 400 PPM/°C 10.1Ω~10MΩ : ± 100 PPM/°C	4.8 Natural resistance change per temp. degree centigrade. $\frac{R2-R1}{R1(t2-t1)} \times 10^6 \quad (\text{PPM/ } ^\circ\text{C})$ R1: Resistance value at room temperature (T1) R2: Resistance value at room temp. plus 100 °C(T2) Test pattern: room temp. (T1), room temp. +100°C(T2)
Short time overload	Resistance change rate is ± (1.0% + 0.1Ω) Max.	4.13 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds
Soldering temp. reference	Electrical characteristics shall be satisfied. Without distinct deformation in appearance. (95 % coverage Min.)	<p>Wave soldering condition: (2 cycles Max.) Pre-heat : 100 ~ 120 °C, 30 ± 5 sec. Suggestion solder temp.: 235 ~ 255 °C, 10 sec. (Max.) Peak temp.: 260 °C</p> <p>Reflow soldering condition: (2 cycles Max.) Pre-heat : 150 ~ 180 °C, 90 ~ 120 sec. Suggestion solder temp.: 235 ~ 255 °C, 20 ~ 40 sec. Peak temp.: 260 °C</p>  <p>Hand soldering condition: The soldering iron tip temperature should be less than 300°C and maximum contract time should be 5 sec.</p>
Soldering heat	Resistance change rate is: ±(1%+0.05Ω) Max.	4.18 Dip the resistor into a solder bath having a temperature of 260°C±3°C and hold it for 10±1 seconds.

# Anti Surge SMD Resistor



## Performance specification :

Characteristics	Limits	Test Methods ( JIS C 5201-1 )															
Temperature cycling	Resistance Change Rate Is± (1.0% + 0.05Ω) Max.	4.19 Resistance change after continuous 5 cycles for duty cycle specified below :															
		<table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55°C ± 3°C</td> <td>30 mins</td> </tr> <tr> <td>2</td> <td>Room temp.</td> <td>10~15 mins</td> </tr> <tr> <td>3</td> <td>+155°C ± 2°C</td> <td>30 mins</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>10~15 mins</td> </tr> </tbody> </table>	Step	Temperature	Time	1	-55°C ± 3°C	30 mins	2	Room temp.	10~15 mins	3	+155°C ± 2°C	30 mins	4	Room temp.	10~15 mins
		Step	Temperature	Time													
		1	-55°C ± 3°C	30 mins													
		2	Room temp.	10~15 mins													
3	+155°C ± 2°C	30 mins															
4	Room temp.	10~15 mins															
Humidity	Resistance change rate is ± (3.0% + 0.1Ω) Max.	4.24 Temporary resistance change after 240 hours exposure in a humidity test chamber controlled at 40 ±2°C and 90-95% relative humidity															
Load life in humidity	Resistance change rate is ± (3.0% + 0.1Ω) Max.	7.9 Resistance change after 1,000 hours (1.5 hours "on", 0.5 hour "off" ) at RCWV in a humidity chamber controlled at 40°C ± 2°C and 90 to 95 % relative humidity															
Load Life	Resistance change rate is ± (3.0% + 0.1Ω) Max.	4.25.1 Permanent resistance change after 1,000 hours operating at RCWV, with duty cycle of (1.5 hours"on", 0.5 hour"off") at 70°C ± 2°C ambient															
Terminal bending	Resistance change rate is ±(1.0% + 0.05Ω) Max.	4.33 Twist of Test Board : Y/X = 3/90 mm for 60 seconds															



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## Environment Related Substance

This product complies to EU RoHS directive, EU PAHs directive, EU PFOS directive and Halogen free.

Ozone layer depleting substances.

Ozone depleting substances are not used in our manufacturing process of this product.

This product is not manufactured using Chloro fluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs), Hydrobromofluorocarbons (HBFCs) or other ozone depleting substances in any phase of the manufacturing process.

## Storage Condition

The performance of these products, including the solderability, is guaranteed for a year from the date of arrival at your company, provided that they remain packed as they were when delivered and stored at a temperature of  $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$  and a relative humidity of  $60\%\text{RH} \pm 10\%\text{RH}$ , chemical and dust free atmosphere

Even within the above guarantee periods, do not store these products in the following conditions. Otherwise, their electrical performance and/or solderability may be deteriorated, and the packaging materials (e.g. taping materials) may be deformed or deteriorated, resulting in mounting failures.

1. In salty air or in air with a high concentration of corrosive gas, such as  $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SO}_2$ , or  $\text{NO}_2$
2. In direct sunlight