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lead-free

SPECIFICATIONS

High Power Thick Film Chip Resistor

SP12-Serie

Version March 2018

CHANGE NOTIFICATION HISTORY			
Version	**Date of Version**	**History**	**Remark**
1	2018/03/29	High power (SP12) series	
		Power Rating : 3W	

Customer: SWISSDIS AG	**Part No.: SP123WFxxxxT2E**

1. Scope:

This specification for approval relates to Extra - High Power Thick Film Chip Resistors manufactured by ROYALOHM 's specifications.

2. Type designation:

The type designation shall be in the following form:

	Type	Power Rating	Resistance tolerance	Nominal Resistance
Ex.	SP12 (2512)	3W	F	10Ω

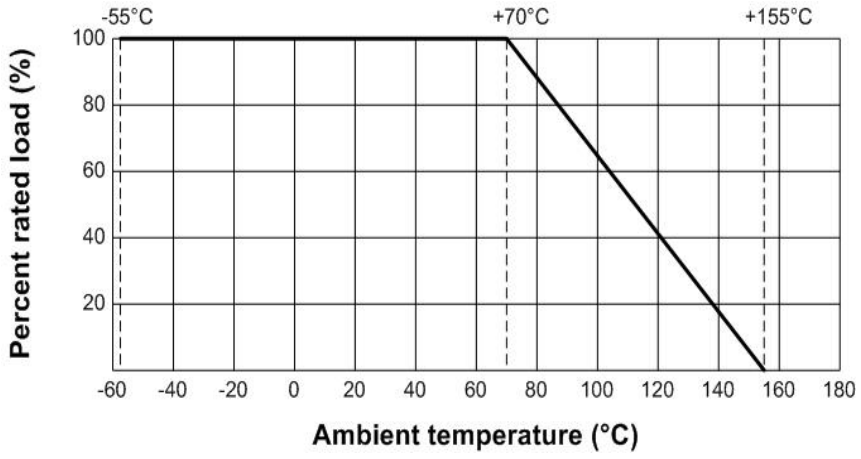
3. Ratings:

Type	SP12 (2512)
Power Rating at 70 ℃	3W
Rated Current (Jumper)	2 A
Max. Overload Current (Jumper)	10 A
Max. Working Voltage	250 V
Max. Overload Voltage	500 V
Diclectric Withstanding Voltage	500 V
Temperature Range	-55℃～+155℃
Ambient Temperature	70 ℃

3.1 Power rating:

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

Figure 1

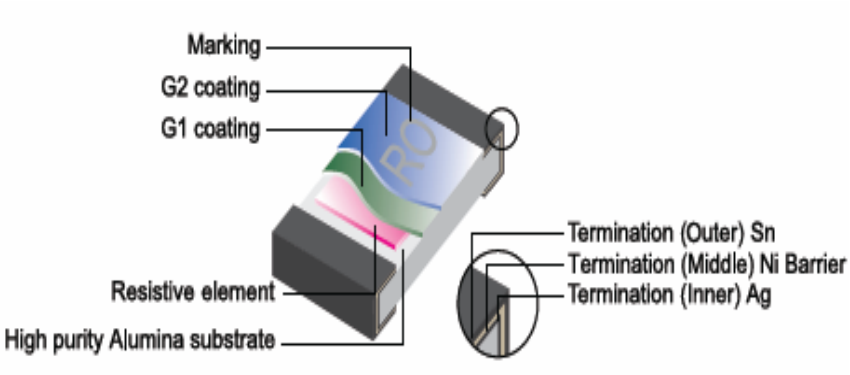


3.2 Nominal Resistance

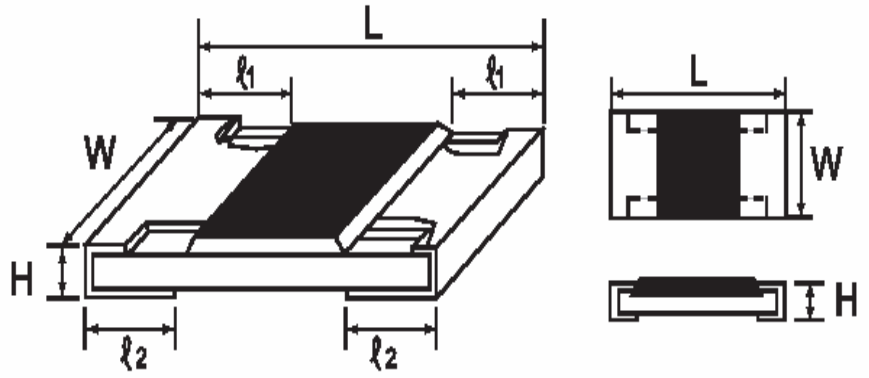
Effective figures of nominal resistance shall be in accordance with E-24 and E-96 series E-96 series for 1 %

Extra - High Power Thick Film Chip Resistors

4. Construction :



5. Power rating and dimensions



Dimension :

Type	Dimension (mm)				
	L ± 0.10	W ± 0.15	H ± 0.10	ℓ1 ± 0.25	ℓ2 ± 0.20
SP12 (2512)	6.35	3.20	1.10	0.60	1.80

Power Rating :

Type	Power Rating at 70 ℃	Tolerance %	Resistance Range	Standard Series
SP12 (2512)	3W	Jumper	< 30mΩ	
		± 1	10Ω ~ 1MΩ	E-96

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6. Marking :

6.1 Resistors

A. Marking for E-96 series in SP12 size : 4 Digits

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

Ex.

	1003	

100KΩ

*For ohmic values below 100 Ω, letter"R" is for decimal point.

Ex.

	1R80	

1.8Ω

6.2 Labels

Label shall be marked with the following item :

A. Nominal Resistance and Resistance Tolerance

B. Power Rating and Size

C. Quantity

D. Part No.

E. Lot No.

Ex.

ROYALOHM

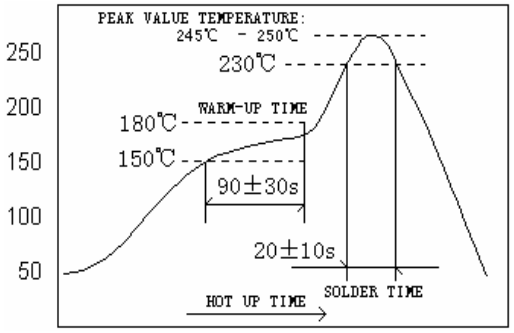
CHIP RESISTOR

RESISTANCE:	10	Ω	± 1 %
WATTAGE:	3W	SIZE:	SP12
QUANTITY:	2,000	PCS	Pb-Free
PART NO.:			
P.O.NO.:			
LOT NO. :	825723	SP123WF100JT2E	

Remark : Label is 10R, value is 10Ω, marking is 10R0

Extra - High Power Thick Film Chip Resistors

7. 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℃ metallic v-block and shall be tested at ac potential respectively specified in the type for 60-70 seconds
Temperature Coefficient	1Ω~10Ω ≤± 200PPM/℃ 10.1Ω~10MΩ ≤± 100PPM/℃	4.8 Natural resistance change per temp. degree centigrade. $\frac{R2-R1}{R1(t2-t1)} \times 10^6$ (PPM/℃) R1: Resistance value at room temperature (T1) R2: Resistance value at room temp. plus 100 ℃(T2) Test pattern: room temp. (T1), room temp. +100℃(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
Solderability	95 % coverage Min.	Wave Solder: Test temperature of solder: 245°C ±3°C dipping time in solder : 2-3 seconds.
		Refolw: 
Soldering heat	Resistance change rate is: ± (1.0%+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.
Temperature cycling	Resistance change rate is ± (0.5% + 0.1Ω) Max.	4.19 Resistance change after continuous 5 cycles for duty cycle specified below :

Step	Temperature	Time
1	-55℃ ± 3℃	30 mins
2	Room temp.	10～15 mins
3	+155℃ ± 2℃	30 mins
4	Room temp.	10～15 mins

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7. Performance specification :

Characteristics	Limits	Test Methods (JIS C 5201-1)
Humidity	Resistance change rate is ± (0.5% + 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 ± (1.0% + 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℃ ± 2℃ and 90 to 95 % relative humidity
Load Life	Resistance change rate is ± (1.0% + 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℃ ± 2℃ 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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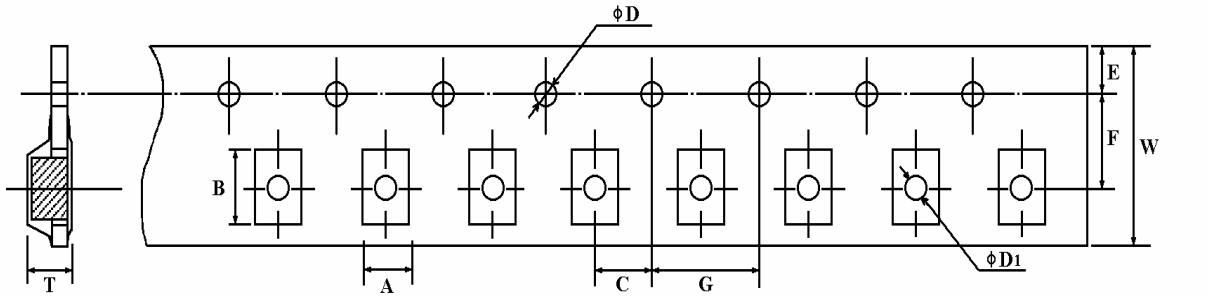
8. Packing specification :

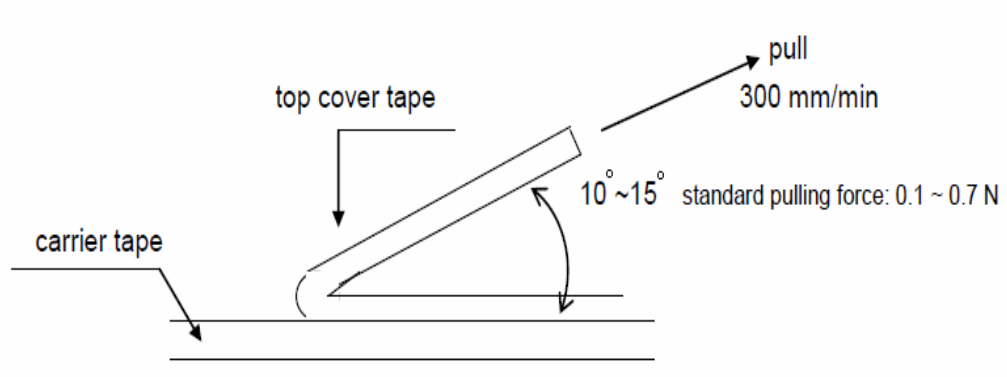
* Taping Dimension (mm)



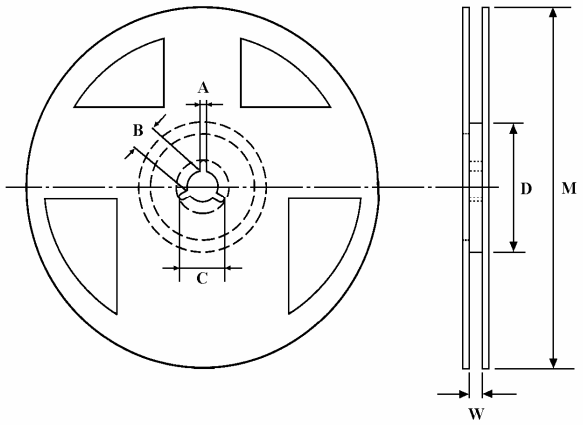
Type	A ±0.20	B ±0.20	C ±0.05	ϕ D+0.1 - 0	E ±0.10	F ±0.05	G ±0.1	W ±0.20	ϕ D1+0.1 - 0	T ± 0.1
SP12 (2512)	3.5	6.7	2.0	1.5	1.75	5.5	4.0	12	1.5	1.35

* Peeling Strength of Top Cover Tape

Test Condition: 0.1 to 0.7 N at a peel-off speed of 300 mm / min.



* Reel Dimension (mm)

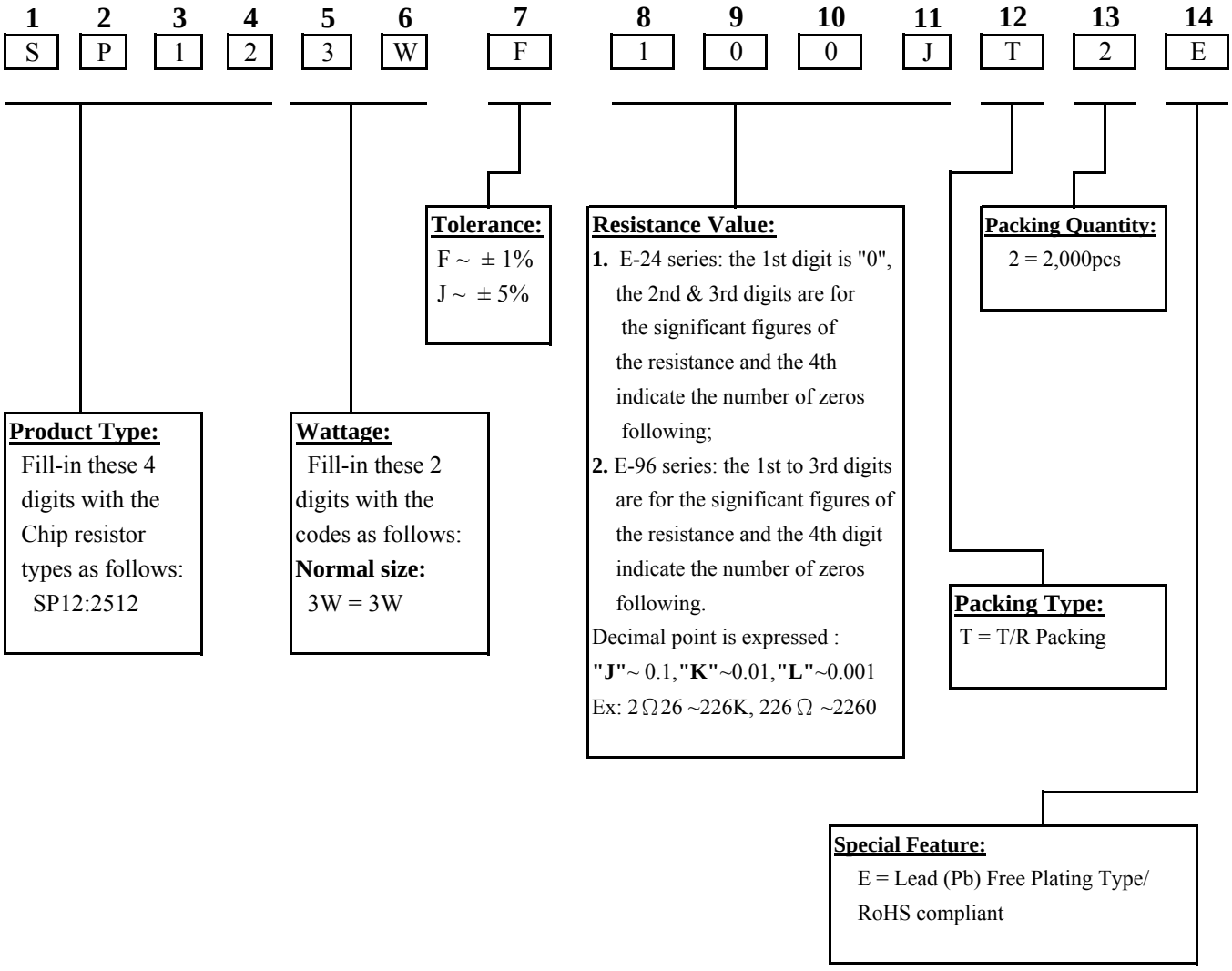


Type	Quantity Per Reel	A ± 0.5	B ± 0.5	C ± 0.5	D ± 1	M ± 2	W ±1
SP12 (2512)	2,000 Pcs. Reel	2	13	21	60	178	13.8

Part Number System

Explanation of Part Number System

(Extra - High Power Thick Film Chip Resistors)



Sample : SP12 3W (2512) +/-1% 10Ω T/R-2,000 → SP123WF100JT2E

Extra - High Power Thick Film Chip Resistors

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.

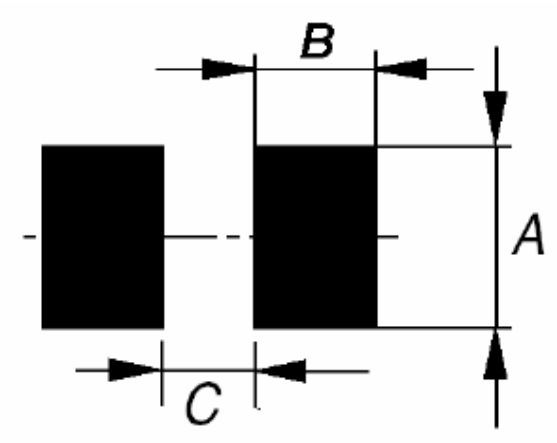
Storage Condition

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°C ± 10°C and a relative humidity of 60%RH ± 10%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 Cl_2, H_2S, NH_3, SO_2, or NO_2
2. In direct sunlight

Recommended solder pad



A	B	C
3.7 mm.	2.8 mm.	2.7 mm.

4 layers PCB specification:

1) Outside 2 layers (Top and Bottom) with copper foil thickness at 2oz.

2) Inside 2 layers (Middle layers) with copper foil thickness at 4 oz.