1. INTRODUCTION

- To wind the alkaline less ceramic core with metal alloy resistance wire and coating with silicon resin which makes wire wound resistor KNP series
- Small in size comparatively than other kind resistor
- Electrical and Mechanical stability and high reliability

2. FEATURES

- High stable pulse characteristics!
- Meet JIS-C-5201 requirements!
- Super heat dissipation!
- Low noise!
- No annual shift on resistance value!
- Special tight tolerance are available on request!

3. EXPLANATIONS OF ORDERING CODE

DESCRIPTION : KNP 1W 5% 100Ω

SYNTON CODE : KNP 100 J 101 T

SERIES	POWER	TOLERANCE	RESISTANCE	PACKAGE
WIRE WOUND RESISTOR KNP TYPE	025 : 1/4W 050 : 1/2W 100 : 1W 200 : 2W 300 : 3W 500 : 5W 600S:6W 700 : 7W 1000:10W 100 S : 1W small Size (Please see detail of Figure1)	F : ±1% G : ±2% J : ±5%	VALUE E24 Series 5% 3 Digits : 2R2 : 2.2Ω 100 : 10Ω 101 : 100Ω 102 : 1K E96 Series 1% 4 Digits : 2R20 : 2.2Ω 10R0 : 10Ω 1000 : 100Ω 1001 : 1K (Please see detail of Figure7&8)	T=Tape Box S=Tape 26mm TR=Tape Reel B=Bulk M / MK / MB= Forming horizontal type F / FK / FKK= Forming vertical type (Please see detail of Figure4.5 & 6)

4. ELECTRICAL CHARACTERISTICS

TYPE	Power Rating at 70℃	Operating Temp. Range	Maximum Working Volt.	Maximum Overload Volt.	Dielectric withstanding Volt	Value Range Standard (Ω)	Special(Ω)	
							High	Low
KNP-25	1/4W	—55℃～＋155℃	250V	350V	300V	0.1~60	150	0.0067
KNP-50S	1/2W		250V	350V	300V	0.1~60	150	0.0067
KNP-50	1/2W		250V	350V	300V	0.1~100	350	0.0019
KNP-100SS	1W		250V	350V	300V	0.1~60	150	0.0067
KNP-100S	1W		250V	350V	300V	0.1~100	350	0.0019
KNP-100	1W		300V	450V	400V	0.1~100	600	0.0017
KNP-200SS	2W		300V	450V	400V	0.1~100	350	0.0019
KNP-200S	2W		300V	450V	400V	0.1~100	600	0.0017
KNP-200	2W		300V	450V	400V	0.1~100	1.2K	0.0020
KNP-250S	2.5W		300V	450V	400V	0.1~100	600	0.0017
KNP-300SS	3W		300V	450V	400V	0.1~100	600	0.0017
KNP-300S	3W		300V	450V	400V	0.1~100	1.2K	0.0020
KNP-300	3W		300V	450V	400V	0.1~100	1.5K	0.0025
KNP-500S	5W		300V	450V	400V	0.1~100	1.5K	0.0025
KNP-500	5W		300V	450V	400V	0.1~100	1.2K	0.0020
KNP-600S	6W		300V	450V	400V	0.1~100	1.5K	0.0025
KNP-700	7W		300V	450V	400V	0.1~1K	3.9K	0.0040
KNP-800	8W		300V	450V	400V	0.1~1K	3.9K	0.0040
KNP-1000S	10W		300V	450V	400V	0.1~1K	3.9K	0.0040
KNP-1000	10W		300V	450V	400V	0.1~1K	5.8K	0.0047
Temp. Coefficient		±300PPM /℃ , special low to ±25PPM high to ±1500PPM						
Remark		Special Low And High Values Are Available On Your Request.						

Figure 1

5. POWER RATING

(1)Power Derating : The rated power at the temperature in excess of 70℃ shall be derated in accordance with figure2

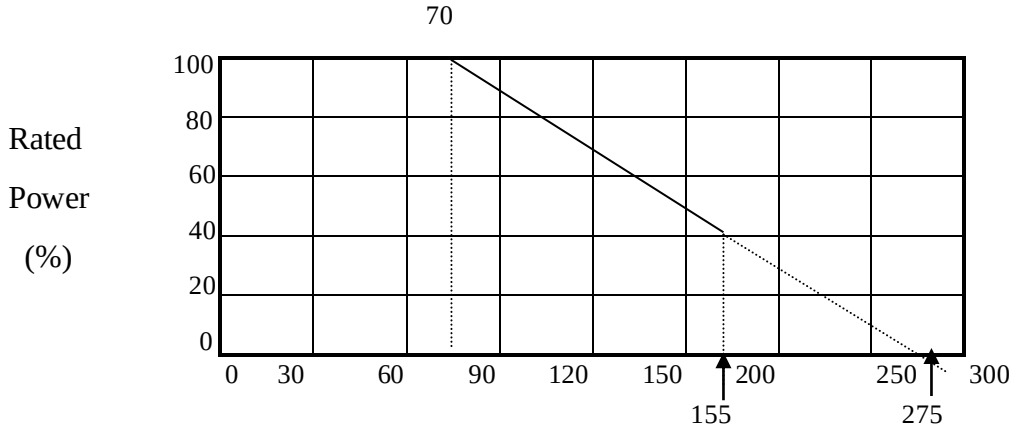
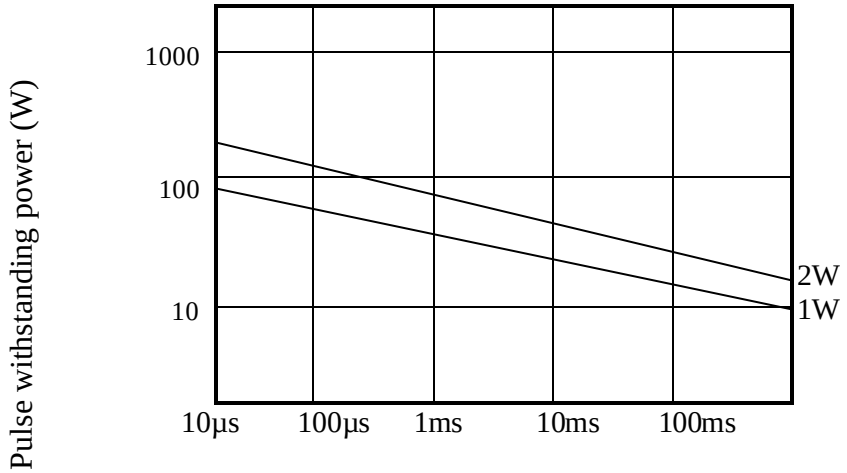


Figure2

(2)Pulse Loading Characteristics

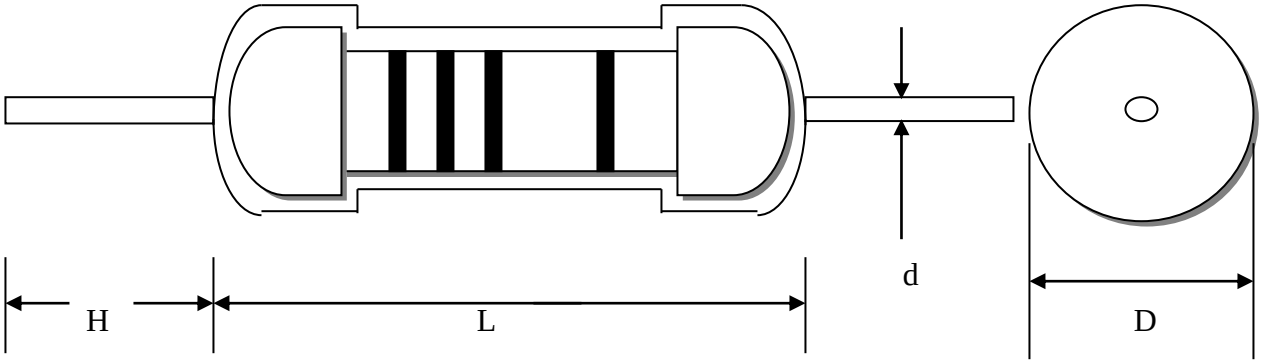


(3)Rated Voltage : The DC or AC(rms) continuous working voltage corresponding to the rated power is determined by the following formula:

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

Where E : Continuous rated DC or AC (rms) working voltage (v)
P : Rated power (w)
R : Resistance value (Ω)

6. DIMENSIONS



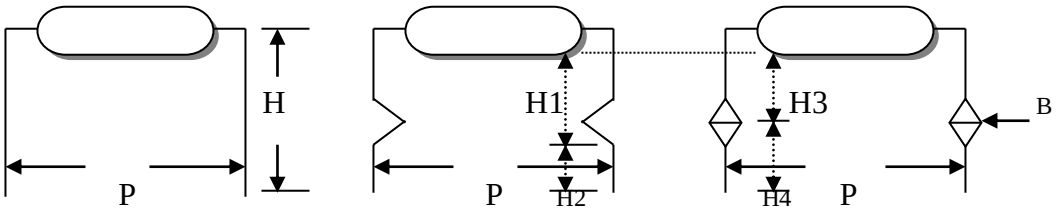
Unit:m/m

TYPE		L	D	H	d
KNP-25	1/4W	6.0 ± 1.5	2.3 ± 1.0	25 ± 3	0.45 ± 0.05
KNP-50S	1/2W				
KNP-100SS	1W				
KNP-50	1/2W	9.0 ± 1.5	3.2 ± 1.0	25 ± 3	0.5 ± 0.1
KNP-100S	1W				
KNP-200SS	2W				
KNP-100	1W	11 ± 1.5	4.5 ± 1.0	35 ± 3	0.65 ± 0.1
KNP-200S	2W				
KNP-200	2W	15 ± 1.5	5.0 ± 1.0	35 ± 3	0.7 ± 0.1
KNP-300SS	3W	11 ± 1.5	4.5 ± 1.0	35 ± 3	0.65 ± 0.1
KNP-300S	3W	15 ± 1.5	5.0 ± 1.0	35 ± 3	0.7 ± 0.1
KNP-300	3W	17 ± 1.5	6.0 ± 1.0	35 ± 3	0.7 ± 0.1
KNP-500S	5W	15 ± 1.5	5.0 ± 1.0	35 ± 3	0.7 ± 0.1
KNP-500	5W	17 ± 1.5	6.0 ± 1.0	35 ± 3	0.7 ± 0.1
KNP-600S	6W	17 ± 1.5	6.0 ± 1.0	35 ± 3	0.7 ± 0.1
KNP-700	7W	39 ± 2.0	8.0 ± 1.5	28 ± 3	0.7 ± 0.1
KNP-800	8W				
KNP-1000S	10W				
KNP-1000	10W	52 ± 3.0	8.0 ± 1.5	35 ± 3	0.7 ± 0.1

Figure3

(1) FORMING PACKING

M / MK / MB= Forming horizontal type



M TYPE **MK TYPE** **MB TYPE**

Unit : m/m

TYPE	POWER	FORMING Type	P ± 1	H ±2.5	H1 ± 1	H2 ± 1	H3 ± 1	H4 ± 1
KNP-25 KNP-50S KNP-100SS	1/4W 1/2W 1W	M	10~	5~	—	—	—	—
		MK		—	5 8	3~	—	—
KNP-50 KNP-100S KNP-200SS	1/2W 1W 2W	M	12.5~	10~	—	—	—	—
		MK.MB		—	5 8	3~	5 8	5~
KNP-100 KNP-200S KNP-250S KNP-300SS	1W 2W 2.5W 3W	M	15~	10~	—	—	—	—
		MK.MB		—	5 8	3~	5 8	5~
KNP-200 KNP-300S KNP-500S	2W 3W 5W	M	20~	10~	—	—	—	—
		MK MB		—	5 8	3~	5 8	5~
KNP-300 KNP-500	3W 5W	M	25~	10~	—	—	—	—
		MK MB		—	6	3~	6	5~

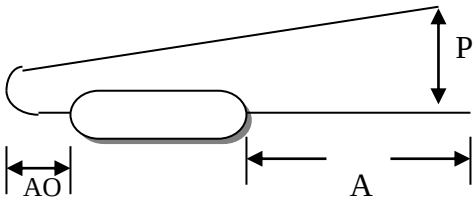
Remark: 1. B = 1.15 ~

ALTERNATE MARKING METHOD ALSO AVAILABLE ON REQUEST.

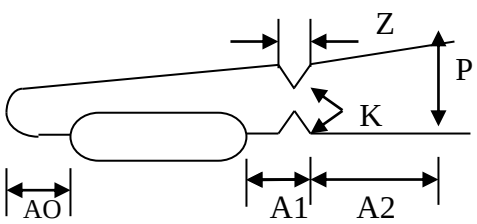
Figure4

(2) FORMING PACKING

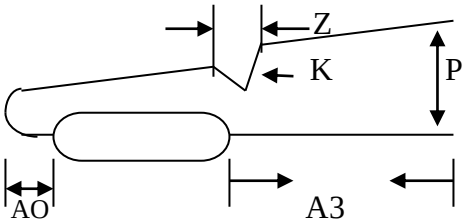
F / FK / FKK=Forming vertical type



F TYPE



FKK TYPE



FK TYPE

Unit : m/m

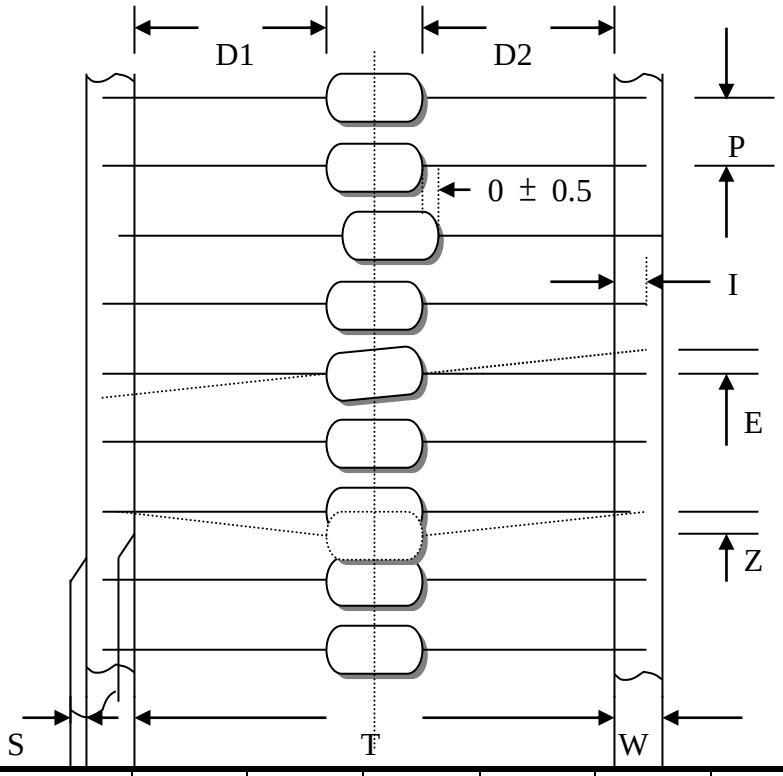
TYPE	POWER	FORMING Type	P ± 1	A ± 1	A1 ± 1	A2 ± 1	A3 ± 1	A0 Max
KNP-25 KNP-50S KNP-100SS	1/4W 1/2W 1W	F	5~10	25±3	—	—	—	4.0
		FK	5~10	—	—	—	25±3	4.0
		FK FKK	5~10	—	4	3~	5~	4.0
KNP-50 KNP-100S KNP-200SS	1/2W 1W 2W	F	5~10	5~	—	—		4.0
		FK	5~10				25±3	4.0
		FK FKK	5~10		4	3~	5~	4.0
KNP-100 KNP-200S KNP-250S KNP-300SS	1W 2W 2.5W 3W	F	5~10	5~	—	—	—	4.0
		FK FKK	5~10	—	4	3~	5~	4.0
KNP-200 KNP-300S KNP-500S	2W 3W 5W	F	5~10	5~	—	—	—	4.0
		FK FKK	5~10	—	4	3~	5~	4.0
KNP-300 KNP-500	3W 5W	F	5~10	5~	—	—	—	4.0
		FK FKK	5~10	5~	4	3~	5~	4.0

Remark: 1.Z = 3 ±1. K = 2 ±0.5,

ALTERNATE MARKING METHOD ALSO AVAILABLE ON REQUEST.

Figure5

(3) TAPE PACKING (T-TYPE)



Unit:m/m

TYPE		SIZE	T	P ±0.5	W ±0.5	D1—D2 Max.	E Max.	Z Max.	S Max.	I Min.
KNP-25 KNP-50S KNP-100SS	1/4W 1/2W 1W	T-26	26±1.0	5	6	1.0	1	1.2	1	3
		T-52	52±2.0	5	6	1.0	1	1.2	1	3
KNP-50 KNP-100S KNP-200SS	1/2W 1W 2W	T-52	52±2.0	5	6	1.2	1	1.2	1	3
KNP-100	1W	T-52	52±2.0	5	6	1.2	1	1.2	1	3
KNP-200S	2W	T-63	63±2.0	5	6	1.4	1	1.2	1	3
KNP-250S KNP-300SS	2.5W 3W	T-74	74±2.0	5	6	1.4	1	1.2	1	3
KNP-200	2W	T-52	52±2.0	10	6	1.2	1	1.2	1	3
KNP-300S	3W	T-63	63±2.0	10	6	1.4	1	1.2	1	3
KNP-500S	5W	T-74	74±2.0	10	6	1.4	1	1.2	1	3
KNP-300	3W	T-63	63±2.0	10	6	1.4	1	1.2	1	3
KNP-500 KNP-600S	5W 6W	T-74	74±2.0	10	6	1.4	1	1.2	1	3
KNP-500B KNP-700S	5W 7W	T-86	86±2.0	10	6	1.4	1	1.2	1	3

Figure6

7. CHARACTERISTICS

(1) Insulation Resistance

Test Method : Resistors shall be clamped in the trough of a 90 degree metallic V-block, apply DC 100V between this electrode and another lead wire for 1 minute.

Acceptance Standard : 1,000 M ohm above

(2) Terminal Strength

Test Method : Pull a resistor with a weight of 1 kg for 5 seconds. Bend the terminal lead wire with 500gs weight for 90 degree and bend it for 90 degree oppositely and return to normal.

Acceptance Standard : Resistance shall not change more than ±1%. No evidence of mechanical damage.

(3) Vibration

Test Method : Total amplitude of 1.5mm. The frequency shall vary from 10 HZ to 55 HZ, for approximate 1 second. Make this test in the direction parallel to the resistor axis, and up/down for 2 hours respectively. (altogether 6 hours.)

Acceptance Standard : Resistance shall not change more than ±1%. No evidence of mechanical damage.

(4) Short Time Overload

Test Method : Resistors shall be tested 2.5 times rated voltage for 5 seconds at ambient room temperature.

Acceptance Standard : Resistance shall not change more than ±2%. No evidence of mechanical damage.

(5) Load Life

Test Method : Thermostatic chamber at a temperature of 70±5℃ under a rated DC voltage for 1.5 hours on and 1/2 hour off repeat this cycle for 1000±12 hours.

Acceptance Standard : Resistance shall not change more than ±5%. No evidence of mechanical damage.

(6) Moisture Resistance

Test Method : At temperature of 40±2℃ and a relative humidity of 90-95% for 1000±12 hours, under a rating DC voltage for hours on and 1/2 hour off.

Acceptance Standard : Resistance shall not change more than ±5%. No evidence of mechanical damage.

(7) Temperature Cycling

Test Method :

STEP	1	2	3	4
TEMP	-55±3℃	20±5℃	85±2℃	20±5℃
TIME	30min.	10~15min.	30min.	10~15min.

Form 1 to 4 is a cycle as shown above, repeat 5 cycles Measure resistance after 1 hour in normal temperature.

Acceptance Standard : Resistance shall not change more than ±1%. No evidence of mechanical damage.

(8) Resistance to Soldering Heat

Test Method : Immerse each terminal wire of a resistor up to 4±0.8mm away from the resistor body in the solder tank at 350±10℃ for 3±0.5 seconds. Measure resistance in 3 hours.

Acceptance Standard : .Resistance shall not change more than ±1%. No evidence of mechanical damage.

(9) Resistance to Solvent

Test Method : immerse a resistor completely in reagent at a temperature of 20~25℃ for 30±5 seconds.

Acceptance Standard : No evidence of mechanical damage.

(10) Dielectric Withstanding Voltage

Test Method : Resistors shall be clamped in the trough of a 90 degree metallic V-black, apply AC between this electrode and another lead wire for 1 minute.

Acceptance Standard : Resistance shall not change more than ±1%. No evidence of mechanical damage.

(11) Solderability

Test Method : apply flux to the terminal wire of a resistor up to 4±0.8mm away from the resistor body and immerse the flux applied portion in the solder tank at 260±5℃ for 3±0.5 seconds

Acceptance Standard : more than 95% of a circumference of the immersed portion shall be completely covered with new solder.

(12) Soldering Recommendation

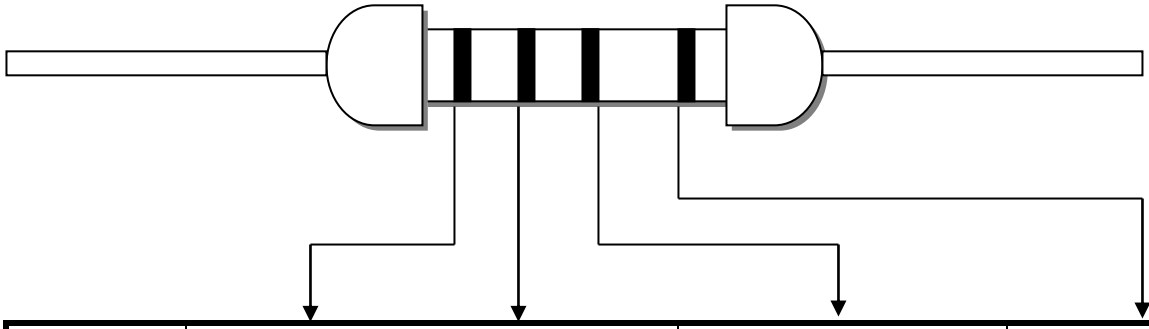
Test Method : The Standard Length of epoxy on the terminal of our product is less than 1.5mm. Also, the Standard Welding Point must be over than 1.6mm from Resistor body.

- **Rated continuous Working Voltage (RCWV)**

$$= \sqrt{\textbf{power rating} \times \textbf{resistance value}}$$

8. COLOR CODING

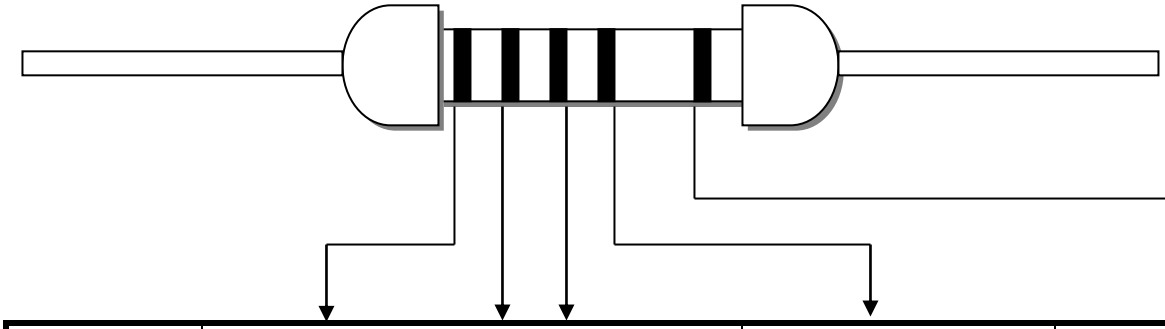
J (±5%)



Color	1st, 2nd (Significant Figure)		3rd (Multiplier)	4th (Tolerance)
Black	0	0	10^{0}	—
Brown	1	1	10^{1}	—
Red	2	2	10^{2}	—
Orange	3	3	10^{3}	—
Yellow	4	4	10^{4}	—
Green	5	5	10^{5}	—
Blue	6	6	10^{6}	—
Violet	7	7	10^{7}	—
Gray	8	8	10^{8}	—
White	9	9	10^{9}	—
Gold	—	—	10^{-1}	J (±5%)
Silver	—	—	10^{-2}	—
Plain	—	—	10^{-3}	—

Figure7

F (± 1%) G (± 2%)
D (± 0.5%)
C (± 0.25%)
B (± 0.1%)



Color	1st, 2nd 3rd (Significant Figure)			(Multiplier)	(Tolerance)
Black	0	0	0	10^0	—
Brown	1	1	1	10^1	F (±1%)
Red	2	2	2	10^2	G (±2%)
Orange	3	3	3	10^3	—
Yellow	4	4	4	10^4	—
Green	5	5	5	10^5	D (±0.5%)
Blue	6	6	6	10^6	C (±0.25%)
Violet	7	7	7	10^7	B (±0.1%)
Gray	8	8	8	10^8	—
White	9	9	9	10^9	—
Gold	—	—	—	10^{-1}	
Silver	—	—	—	10^{-2}	—
Plain	—	—	—	10^{-3}	—

Figure8

- Stamping for marking of 7W and up.