727 Brea Canyon Road, Walnut, CA 91789
Tel: (909) 468-0046 Fax: (909) 468-2206

SPECIFICATION

Thick Film Chip Resistor

RC Series

SKYWELL TECHNOLOGY INC.
www.skywellnet.com

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1. SUBJECT:

This specification describes of RC series chip resistors made by thick film process.

2. PART NUMBER:

Part number of the chip resistor is identified by the series, size, tolerance and resistance value.

Example：**RC03F1002**

RC03	F	1002
Size Code	**Tolerance**	**Resistance**
RC01=0201	J=±5%	3 digit code
RC02=0402	G=±2%	For E-24
RC03=0603	F=±1%	4 digit code
RC05=0805	B=±0.5%	For E-96
RC06=1206		
RC12=1210		
RC25=2512		

3. MARKING SPECIFICATION:

Marking Explanation:

(1) RC05/RC06/ RC12/RC20/RC25

Either resistance in E-24 or E-96 series: 4 digits, first three digits are significant figures, fourth digit is number of zeros.

Value =10KΩ

(2) RC03/RC05/RC06/RC12/RC20/RC25J

When resistance in E-24 series: 3 digits, first two digits are significant figures, third digit is number of zeros.

Value =10KΩ

(3) RC03F Series

When resistance in E-96 series: 3 digits, use 0603 ±1% EIA-96 marking method. When ±1% tolerance in E-24 series, protective layer distinguished with blue or black color.

Value =12.4 KΩ

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EIA-96 MARKING

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

This table shows the first two digits for the three-digit EIA-96 part marking scheme.
The third character is a letter multiplier:
X=10^{-1} Y=10^{-2} A=10^{0} B=10^{1} C=10^{2} D=10^{3} E=10^{4} F=10^{5}

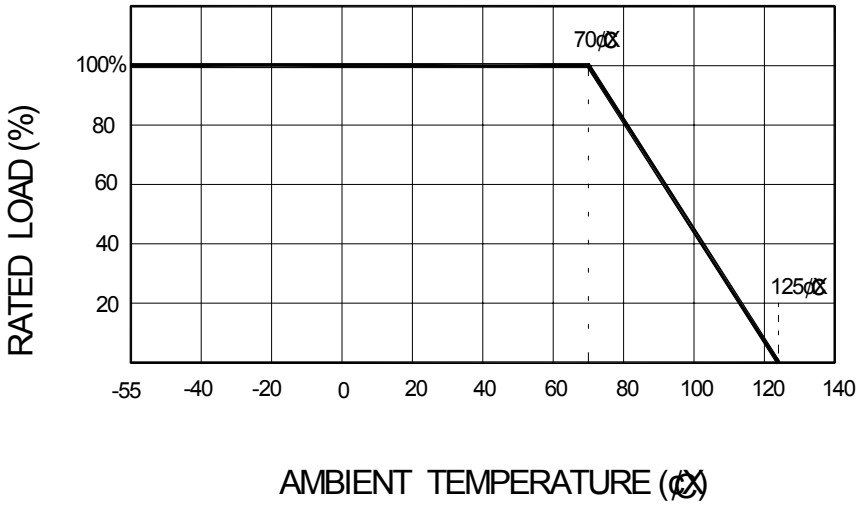
(4) RC01/02 (both J & F)

0201/0402 no marking

0402 0201

4. POWER RATING

(1) Rated Power at 70℃: RC01=1/20W RC02=1/16W RC03=1/10W RC05=1/8W
RC06=1/4W RC12=1/3W RC20=3/4W RC25=1W



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

$$V = \sqrt{(P \times R)}$$

Where V= Continuous rated DC or AC (rms) working voltage(V)
P= Rated power (W)
R= Resistance value (Ω)

5. ELECTRICAL CHARACTERISTICS

Type	RC01	RC02	RC03	RC05
Operating Temp. Range	－55℃ ~ ＋125℃			
Maximum Working Voltage	25V	50V	50V	150V
Maximum Overload Voltage	50V	100V	100V	300V
Dielectric Withstanding Voltage	50V	100V	100V	300V
Resistance Range	10Ω~1MΩ (E-24) Zero Ohm Jumper<0.05Ω	2Ω~10MΩ(E-24) 100Ω~2.2MΩ(E-96) Zero Ohm Jumper<0.05Ω	1Ω~22MΩ(E-24) 10Ω~2.2MΩ(E-96) Zero Ohm Jumper<0.05Ω	1Ω~22MΩ(E-24) 10Ω~2.2MΩ(E-96) Zero Ohm Jumper<0.05Ω
Temperature Coefficient	±200ppm/℃(10Ω~1MΩ)	±200ppm/℃(10Ω~10MΩ) ±400ppm/℃(2Ω~10Ω)	±100ppm/℃(10Ω~1MΩ) ± 200ppm/ ℃ (1 Ω ~10 Ω >1MΩ)	±100ppm/℃(10Ω~1MΩ) ± 200ppm/ ℃ (1 Ω ~10 Ω >1MΩ)

Type	RC06	RC12	RC20	RC25
Operating Temp. Range	－55℃ ~ ＋125℃			
Maximum Working Voltage	200V	200V	200V	200V
Maximum Overload Voltage	400V	400V	400V	400V
Dielectric Withstanding Voltage	500V	500V	500V	500V
Resistance Range	1Ω~22MΩ(E-24) 10Ω~2.2MΩ(E-96) Zero Ohm Jumper<0.05Ω	1Ω~22MΩ(E-24) 10Ω~2.2MΩ(E-96) Zero Ohm Jumper<0.05Ω	1Ω~22MΩ(E-24) 10Ω~2.2MΩ(E-96) Zero Ohm Jumper<0.05Ω	1Ω~22MΩ(E-24) 10Ω~2.2MΩ(E-96) Zero Ohm Jumper<0.05Ω
Temperature Coefficient	±100ppm/℃(10Ω~1MΩ) ± 200ppm/ ℃ (1 Ω ~10 Ω >1MΩ)	±100ppm/℃(10Ω~1MΩ) ± 200ppm/ ℃ (1 Ω ~10 Ω >1MΩ)	±100ppm/℃(10Ω~1MΩ) ± 200ppm/ ℃ (1 Ω ~10 Ω >1MΩ)	±100ppm/℃(10Ω~1MΩ) ± 200ppm/ ℃ (1 Ω ~10 Ω >1MΩ)

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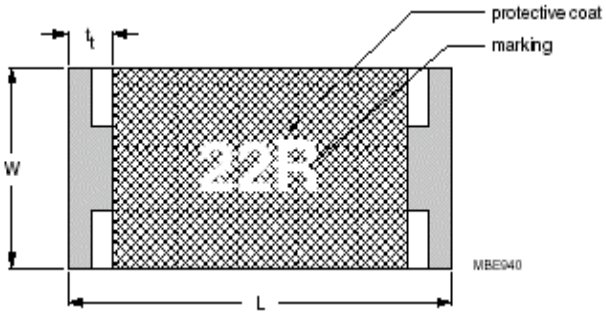
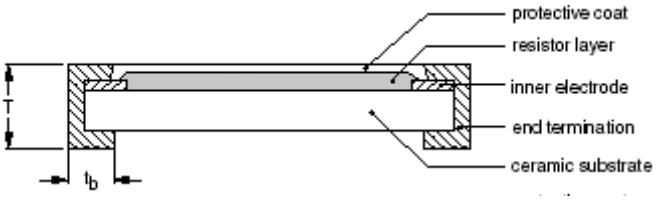
6. SIZE DIMENSIONS



7. BODY CONSTRUCTION



Unit: mm

Type	L	W	H	l_1	l_2
RC01	0.60±0.10	0.30±0.05	0.25±0.05	0.15±0.10	0.15±0.10
RC02	1.00±0.10	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
RC03	1.60±0.10	0.80±0.10	0.45±0.10	0.25±0.15	0.25±0.15
RC05	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.35±0.20
RC06	3.10±0.10	1.60±0.10	0.55±0.10	0.45±0.20	0.40±0.20
RC12	3.10±0.10	2.60±0.15	0.55±0.10	0.50±0.20	0.50±0.20
RC20	5.00±0.10	2.50±0.15	0.55±0.10	0.60±0.20	0.50±0.20
RC25	6.35±0.10	3.20±0.15	0.55±0.10	0.60±0.20	0.50±0.20

8. ENVIRONMENTAL CHARACTERISTICS

(1) Temperature Coefficient of Resistance (T.C.R.)

Test Method: Measure resistance at +25℃ or specified room temperature as R1, then measure at −55℃ or +125℃ respectively as R2. Determine the temperature coefficient of resistance from the following formula.

$$T.C.R. = \frac{R_2 - R_1}{R_1 (t_2 - t_1)} \times 10^6 (PPM/℃)$$

Where t_1 = +25℃ or specified room temperature
t_2 = −55℃ or +125℃ test temperature
R_1 = resistance at reference temperature in ohms.
R_2 = resistance at test temperature in ohms.

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(2) Thermal Shock

Test Method：－55±3℃, 2 minutes and ＋125±2℃, 2 minutes as one cycle. After 5 cycles, the specimen shall be stabilized at room temp. for 1 hour minimum and then measure the resistance to determine △R/R(%).

Acceptance Standard：±(0.5%＋0.05Ω) for 1% tolerance.
±(1%＋0.05Ω) for 5% tolerance.

(3) Low Temperature Operation

Test Method：Place the specimen in a test chamber maintained at -65^{+0}_{-5}℃. After one hour stabilization at this temperature, full rated working voltage shall be applied 45^{+5}_{-0} minutes. Have15^{+5}_{-0} minutes after remove the voltage, the specimen shall be removed from the chamber and stabilized at room temperature for 24 hrs. Measure the resistance to determine △R/R(%).

Acceptance Standard: ±(0.5%＋0.05Ω) for 1% tolerance .
±(1.0%＋0.05Ω) for 5% tolerance.
& No visible damage

(4) Short-Time Overload

Test Method：Apply 2.5 times of rated voltage but not exceeding the maximum overload voltage for 5 seconds. Have the specimen stabilized at room temperature for 30 minutes minimum.
Measure the resistance to determine △R/R(%).

Acceptance Standard: ±(1.0%＋0.05Ω) for 1% tolerance.
±(2.0%＋0.05Ω) for 5% tolerance.
& No visible damage

(5) Insulation Resistance

Test Method: Place the specimen in the jig and apply a rated continues overload voltage (R.C.O.V) for one minute as shown. Measure the insulation resistance.

Size	0201	0402	0603	0805	1206	1210	2010	2512
Voltage	50V	100V	100V	300V	500V	500V	500V	500V

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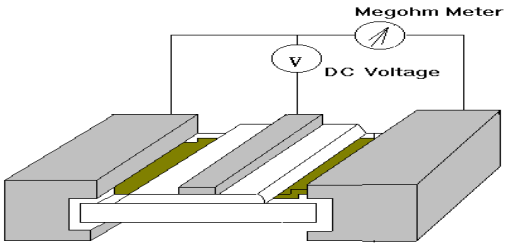
Acceptance Standard：≧10000MΩ



(6) Dielectric Withstand Voltage

Test Method：Place the specimen in the jig and apply a specified value continuous overload voltage as shown for one minute.

Size	0201	0402	0603	0805	1206	1210	2010	2512
Voltage	50V	100V	100V	300V	500V	500V	500V	500V

Acceptance Standard：Breakdown voltage＞specification and without open/short

(7) Resistance to Soldering Heat

Test Method：Immerse the specimen in the solder pot at 260±5℃ for 10±1 seconds. Have the specimen stabilized at room temperature for 30 minutes minimum.
Measure the resistance to determine △R/R(%).

Acceptance Standard：±(0.5%＋0.05Ω) for 1% tolerance.
±(1.0%＋0.05Ω) for 5% toerance.
and no visible damage

(8) Moisture Resistance

Test Method：Place the specimen in the test chamber, and subjected to 42 damp heat cycles. Each one of which consists of the steps 1 to 7 as figure 1. The total length of test is 1000 hours. After the test, have the specimen stabilized at room temperature for 24 hours and measure the resistance to determine △R/R(%).

Acceptance Standard：±(0.5%＋0.05Ω) for 1% tolerance.
±(2.0%＋0.05Ω) for 5% tolerance & no visible damage

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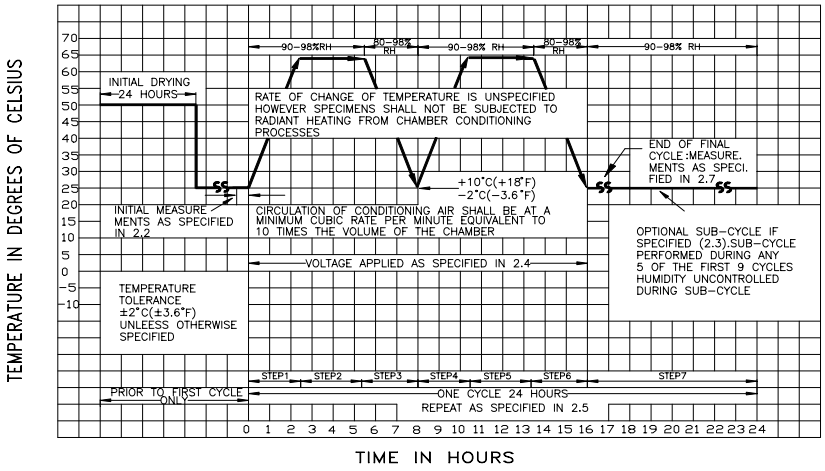

Fig. 1 Conditions of change of temperature

(9) Life Test

Test Method：Place the specimen in the oven at 70±2℃. Apply the rated voltage to the specimen at the 1.5 hours on and 0.5 hour off cycle. The total length of test is 1000 hours. After the test, have the specimen stabilized at room temperature for one hour minimum and measure the △R/R(%).

Acceptance Standard：±(1%+0.05Ω) for 1% tolerance
±(3%+0.05Ω) for 5% tolerance& no visible damage

(10) Solderability

Test Method：Immerse the specimen in the solder pot at 230±5℃ for 5 sec.

Acceptance Standard：At least 95% solder coverage on the termination.

(11) Bending Strength

Test Method：Mount the specimen on a test board as shown in the figure. Slowly apply the force till the board is bent to specified for 5±1sec,and measure the △R/R(%) at this position.

Acceptance Standard：±(1.0%+0.05Ω) for 1% tolerance.
±(1.0%+0.05Ω) for 5% tol. & No visible damage.

Size	0201	0402	0603	0805	1206	1210	2010	2512
Bent distance (d)	3mm	3mm	5mm	5mm	5mm	2mm	2mm	2mm

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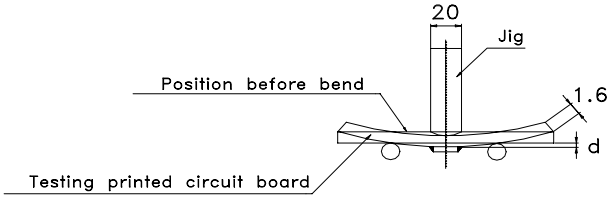
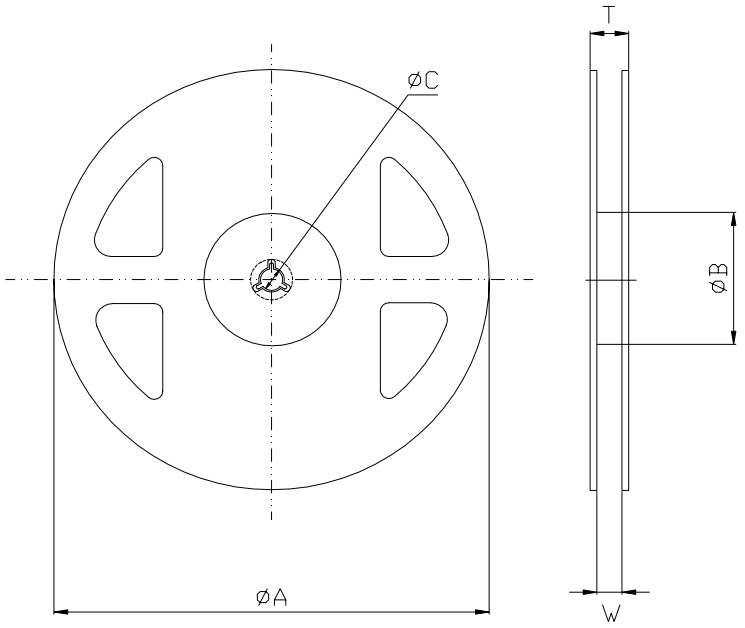
<Test Diagrams>

Unit: mm



9. TAPING REEL SIZE



Unit：mm

Style	Packaging	Tape width	∅A	∅B	∅C	W	T
RC01/RC02/RC03 RC05/RC06/RC12	Paper	8mm	180^{+0}_{-3}	60^{+1}_{-0}	13.0±0.2	9.0±0.3	11.4±1
RC20/RC25	Embossed	12mm	180^{+0}_{-3}	60^{+1}_{-0}	13.0±0.2	13.0±0.3	15.4±1

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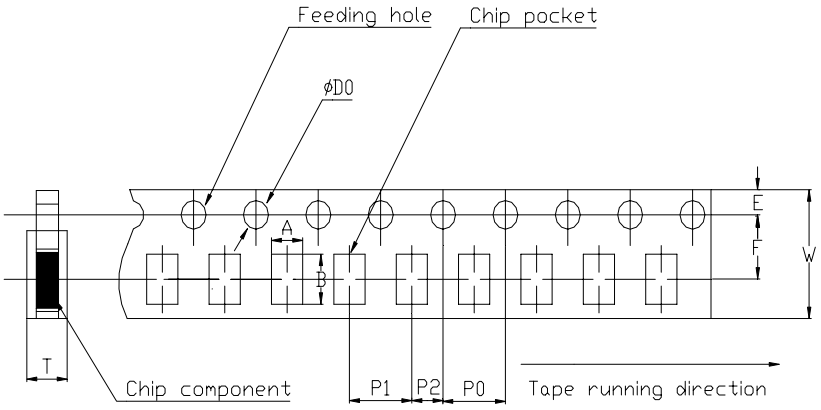
10. TAPE SPECIFICATION

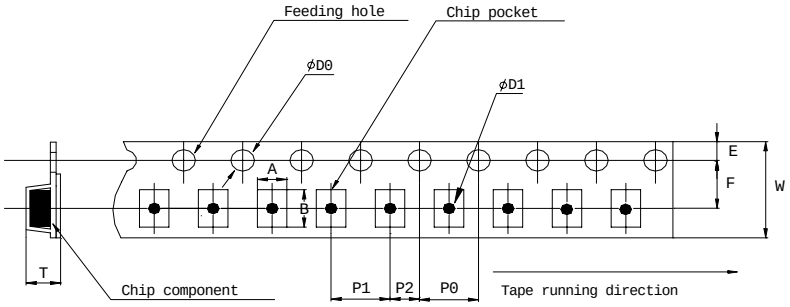
(a) Paper Tapping



Unit: mm

Dimension	A	B	W	E	F	P_0	P_1	P_2	ΦD_0	T
RC 01	0.45±0.1	0.75±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	2.0±0.05	1.5+0.1 -0	0.35±0.10
RC 02	0.65±0.1	1.15±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	2.0±0.05	1.5+0.1 -0	0.53±0.10
RC 03	1.1±0.1	1.90±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.05	2.0±0.05	1.5+0.1 -0	0.70±0.10
RC 05	1.65±0.1	2.40±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.05	2.0±0.05	1.5+0.1 -0	0.85±0.10
RC 06	1.90±0.1	3.50±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.05	2.0±0.05	1.5+0.1 -0	0.85±0.10
RC 12	2.80±0.1	3.50±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.05	2.0±0.05	1.5+0.1 -0	0.85±0.10

(b) Embossed Tapping



Dimension	A	B	W	E	F	P_0	P_1	P_2	ΦD_0	ΦD_0	T
RC 20	2.8±0.2	5.4±0.2	12±0.3	1.75±0.1	5.5±0.05	4.0±0.1	4.0±0.01	2.0±0.05	1.5±0.1	1.5±0.25	1.0±0.10
RC 25	3.5±0.2	6.7±0.2	12±0.3	1.75±0.1	5.5±0.05	4.0±0.1	4.0±0.01	2.0±0.05	1.5±0.1	1.5±0.25	1.0±0.10

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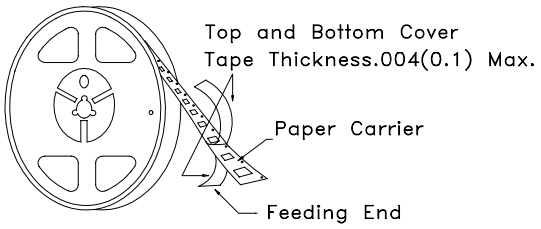
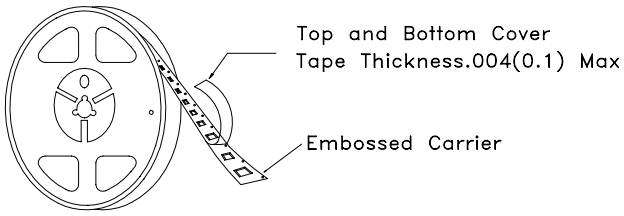
11. PACKING METHODS

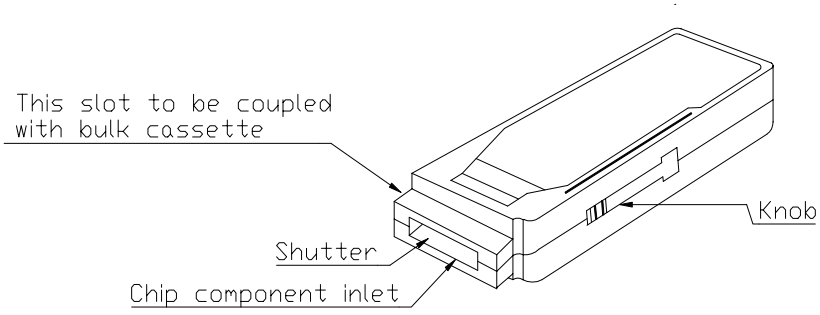
(a) Paper Carrier



(b) Embossed Carrier



(c) Bulk Cassette



Packing Style	Paper Taping Reel (R)			Embossed Taping Reel(K)	Bulk Cassette(C)
	7" (178mm)	10" (254mm)	13" (330mm)	7" (178mm)	
RC01	10,000	20,000	40,000	--	50,000
RC02	10,000	20,000	40,000	--	50,000
RC03	5,000	10,000	20,000	--	25,000
RC05	5,000	10,000	20,000	--	10,000
RC06	5,000	10,000	20,000	--	--
RC12	5,000	10,000	20,000	--	--
RC20	--	--	--	4,000	--
RC25	--	--	--	4,000	--