HoCR Series Chip Resistors Datasheet

This specification applies to all sizes of rectangular-type fixed chip resistors with Ruthenium-base as material

Features

① Small size and light weight
② Highly reliable multilayer electrode construction
③ Compatible with all soldering process
④ Long side terminations

Applications

① Telecommunication Equipments
② Radio and Tape Recorders, TV Tuners
③ Digital Cameras, Watches, Pocket Calculators
④ Computers, Instruments
⑤ Medical and Military Equipment

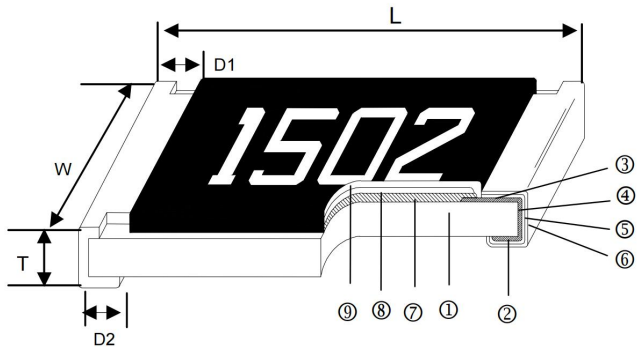
Part Number： Ho CR 1206 1/4W 10KR 1% 100ppm

H o | C R | 1 2 0 6 | 1 / 4 W | 1 0 K R | 1 % | 100ppm

manufacturers	Product Type	Dimensions	power (W)	Resistance	Resistance Tolerance	temperature coefficient
Milliohm electronic	CR	01005	1/32W	1.2R=1R2 3.3KR=3K3 10KR=10K 100KR=100K ...	±0.1% ±0.25% ±0.5% ±1% ±5%	±50ppm ±100ppm ±200ppm ±300ppm ±400ppm
		0201	1/20W			
		0402	1/16W			
		0603	1/10W、1/4W			
		0805	1/8W、1/3W			
		1206	1/4W、1/2W			
		1210	1/3W、3/4W			
		2010	3/4W、1W			
		2512	1W、2W			
		1225	2W			
		0612	3/4W			

高新技术企业 IATF16949 ISO9001 RoHS REACH

Construction



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

Dimensions

Type	Size (Inch)	L (mm)	W (mm)	T (mm)	D1 (mm)	D2 (mm)	Weight (g) (1000pcs)
CR	01005	0.40±0.02	0.20±0.02	0.13±0.02	0.10±0.03	0.10±0.03	0.037
CR	0201	0.60±0.03	0.30±0.03	0.23±0.03	0.15±0.05	0.15±0.05	0.150
CR	0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.20±0.10	0.620
CR	0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20	2.042
CR	0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.40±0.20	4.368
CR	1206	3.10±0.10	1.55±0.10	0.55±0.10	0.50±0.25	0.50±0.20	8.947
CR	1210	3.10±0.10	2.60±0.15	0.55±0.10	0.50±0.25	0.50±0.20	15.959
CR	2010	5.00±0.10	2.50±0.15	0.55±0.10	0.60±0.25	0.50±0.20	24.241
CR	2512	6.35±0.10	3.10±0.15	0.55±0.10	0.60±0.25	0.50±0.20	39.448
CR	1225	3.10±0.15	6.30±0.15	0.90±0.15	0.60±0.30	0.80±0.25	64.88
CR	0612	1.55±0.10	3.10±0.15	0.55±0.10	0.25±0.15	0.35±0.15	9.31

Standard Electrical Specifications

Item / Type	Power Rating at 70°C Jumper Rated Current	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range		TCR (PPM/°C)
					±1%(E24、E96)	±5%(E24)	
CR01005	1/32W	-55 ~ +125°C	15V	30V	10Ω - 1MΩ		±300
	Jumper: 0.5A				0Ω (<50mΩ)		-
CR0201	1/20W	-55 ~ +125°C	25V	50V	1Ω - 10MΩ		±200
	Jumper: 1A				0Ω (<50mΩ)		-
CR0402	1/16W	-55 ~ +155°C	50V	100V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 20MΩ 20.5MΩ - 100MΩ		±200 ±100 ±200 ±400
	Jumper: 1A				0Ω (<50mΩ)		-
CR0603	1/10W	-55 ~ +155°C	75V	150V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 20MΩ 20.5MΩ - 100MΩ		±200 ±100 ±200 ±400
	Jumper: 1A				0Ω (<50mΩ)		-
CR0805	1/8W	-55 ~ +155°C	150V	300V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 20MΩ 20.5MΩ - 100MΩ		±200 ±100 ±200 ±400
	Jumper: 2A				0Ω (<50mΩ)		-
CR1206	1/4W	-55 ~ +155°C	200V	400V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 20MΩ 20.5MΩ - 100MΩ		±200 ±100 ±200 ±400
	Jumper: 2A				0Ω (<50mΩ)		-
CR1210	1/3W	-55 ~ +155°C	200V	400V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 20MΩ 20.5MΩ - 39MΩ		±200 ±100 ±200 ±400
	Jumper: 2.5A				0Ω (<50mΩ)		-
CR2010	3/4W	-55 ~ +155°C	200V	400V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 20MΩ 20.5MΩ - 100MΩ		±200 ±100 ±200 ±400
	Jumper: 3.5A				0Ω (<50mΩ)		-
CR2512	1W	-55 ~ +155°C	200V	500V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 20MΩ 20.5MΩ - 100MΩ		±200 ±100 ±200 ±400
	Jumper: 4A				0Ω (<50mΩ)		-
CR1225	2W	-55 ~ +155°C	200V	400V	10Ω - 20KΩ		±100
	Jumper: 10A				0Ω (<20mΩ)		-
CR0612	3/4W	-55 ~ +155°C	200V	400V	1Ω~1MΩ		±100

High Precision Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range (E24 、E96)			TCR (PPM/°C)
					±0.1%	±0.25%	±0.5%	
CR0402	1/16W	-55 ~ +155°C	50V	100V	-		10Ω - 1MΩ	±100
					-		1.02M - 10MΩ	±200
CR0603	1/10W		75V	150V	10Ω - 1MΩ			±100
					-	1.02M - 10MΩ		±200
CR0805	1/8W		150V	300V	10Ω - 1MΩ			±100
					-	1.02M - 10MΩ		±200
CR1206	1/4W		200V	400V	10Ω - 1MΩ			±100
					-	1.02M - 10MΩ		±200
CR1210	1/3W		200V	400V	10Ω - 1MΩ			±100
					-	1.02M - 10MΩ		±200
CR2010	3/4W		200V	400V	10Ω - 1MΩ			±100
					-	1.02M - 10MΩ		±200
CR2512	1W		250V	500V	10Ω - 1MΩ			±100
					-	1.02M - 10MΩ		±200

TC50 Electrical Specifications

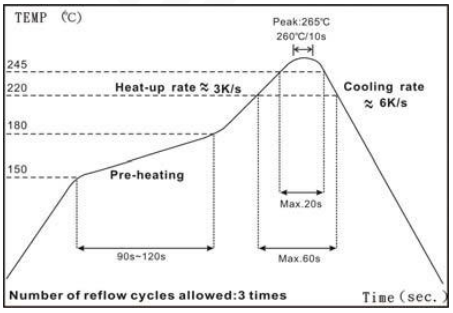
Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range (E24 、E96)				TCR (PPM/°C)
					±0.1%	±0.25%	±0.5%	±1%	
CR0402	1/16W	-55 ~ +155°C	50V	100V	-		100Ω - 1MΩ		±50
CR0603	1/10W		75V	150V	10Ω - 1MΩ	10Ω - 10MΩ			
CR0805	1/8W		150V	300V					
CR1206	1/4W		200V	400V					
CR1210	1/3W		200V	400V					
CR2010	3/4W		200V	400V					
CR2512	1W		250V	500V					

High Power & Ultra High Power Rating Electrical Specifications

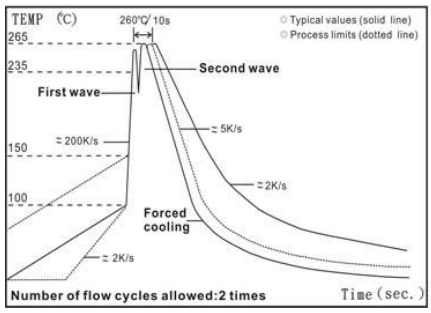
Item / Type	Power Rating at 70℃	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range		TCR (PPM/℃)
					±1% (E24、E96)	±5% (E24)	
CR0402	1/8W	-55 ~ +155℃	50V	100V	1Ω - 9.76Ω 10Ω - 1MΩ 0Ω (<20mΩ)		±200 ±100 -
	Jumper: 1.5A						
CR0603	1/4W		75V	150V			
	Jumper: 2A						
CR0805	1/3W		150V	300V			
	Jumper: 2.5A						
CR1206	1/3 *1/2W		200V	400V			
	Jumper: 3.5A						
CR1210	1/2 *3/4W		200V	400V			
	Jumper: 5A						
CR2010	1W		200V	400V			
	Jumper: 6A						
CR2512	2W		250V	500V			
	Jumper: 7A						

*: Ultra High Power
Operating Voltage=√(P*R) or Max. Operating Voltage listed above, whichever is lower.
Overload Voltage=2.5*√(P*R) or Max. Overload Voltage listed above, whichever is lower.

Soldering Condition



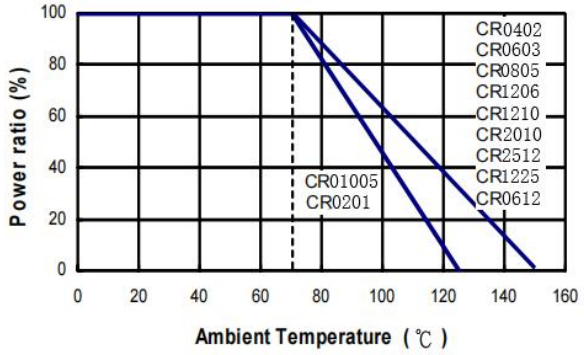
IR Reflow Soldering



Wave Soldering (Flow Soldering)

(1) Time of IR reflow soldering at maximum temperature point 260℃： 10s
(2) Time of wave soldering at maximum temperature point 260℃： 10s
(3) Time of soldering iron at maximum temperature point 410℃： 5s

Derating Curve



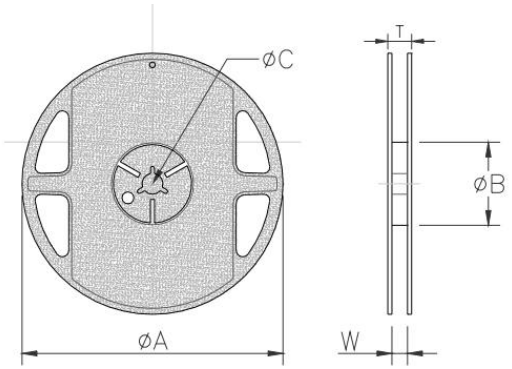
Environmental Characteristics

Item	Requirement			Test Method
	±1% and Below	±5%	Jumper	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.			JIS-C-5201-1 4.8 IEC-60115-1 4.8 -55°C~+125°C, 25°C is the reference temperature
Short Time Overload	±(1.0%+0.05Ω)	±(2.0%+0.05Ω)	< 50mΩ	JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds, 2 seconds for high power series
Insulation Resistance	≥10G			JIS-C-5201-1 4.6 IEC-60115-1 4.6 Max. Overload Voltage for 1 minute
Endurance	±(1.0%+0.10Ω)	±(2.0%+0.10Ω)	< 100mΩ	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1 70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Damp Heat with Load	±(1.0%+0.10Ω)	±(2.0%+0.10Ω)	< 100mΩ	JIS-C-5201-1 4.24 IEC-60115-1 4.24 40±2°C, 90~95% R.H., RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Dry Heat	±(1.0%+0.05Ω)	±(1.5%+0.10Ω)	< 50mΩ	JIS-C-5201-1 4.23 IEC-60115-1 4.23.2 at +125/+155°C for 1000 hrs
Bending Strength	±(1.0%+0.05Ω)	±(1.0%+0.05Ω)	< 50mΩ	JIS-C-5201-1 4.33 IEC-60115-1 4.33 Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm
Solderability	95% min. coverage			JIS-C-5201-1 4.17 IEC-60115-1 4.17 245±5°C for 3 seconds
Resistance to Soldering Heat	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)	< 50mΩ	JIS-C-5201-1 4.18 IEC-60115-1 4.18 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover			JIS-C-5201-1 4.7 IEC-60115-1 4.7 1.42 times Max. Operating Voltage for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤ 10%			JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1 260±5°C for 30 seconds
Rapid Change of Temperature	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)	< 50mΩ	JIS-C-5201-1 4.19 IEC-60115-1 4.19 -55°C to +125/+155°C, 5 cycles

- RCWV(Rated Continuous Working Voltage)=√(P*R) or Max. Operating Voltage whichever is lower.

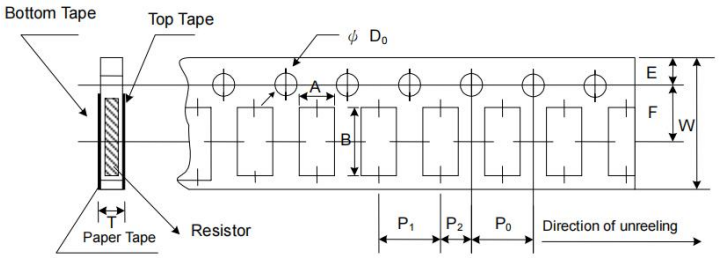
Packaging

Reel Specifications & Packaging Quantity



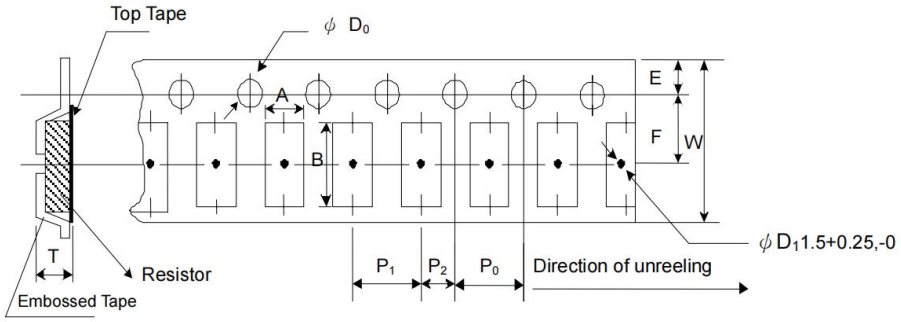
Type	Packaging Quantity		Tape Width	Reel Diameter	ΦA(mm)	ΦB(mm)	ΦC(mm)	W(mm)	T(mm)
CR01005	Paper	10K	8mm	7 inch	178.5±1.5	$60^{+1/-0}$	13.0±0.2	9.0±0.5	12.5±0.5
		20K	8mm	7 inch	178.5±1.5	$60^{+1/-0}$	13.0±0.2	9.0±0.5	12.5±0.5
CR0201	Paper	15K	8mm	7 inch	178.5±1.5	$60^{+1/-0}$	13.0±0.2	9.0±0.5	12.5±0.5
CR0201 CR0402	Paper	10K	8mm	7 inch	178.5±1.5	$60^{+1/-0}$	13.0±0.2	9.0±0.5	12.5±0.5
		20K	8mm	10 inch	254±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
		40K	8mm	13 inch	330±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
CR0603 CR0805 CR1206 CR1210	Paper	5K	8mm	7 inch	178.5±1.5	$60^{+1/-0}$	13.0±0.2	9.0±0.5	12.5±0.5
		10K	8mm	10 inch	254±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
		20K	8mm	13 inch	330±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
CR2010 CR2512	Embossed	4K	12mm	7 inch	178.5±1.5	$60^{+1/-0}$	13.0±0.5	13.0±0.5	15.5±0.5
		8K	12mm	10 inch	250±1.0	62±0.5	13.0±0.5	12.5±0.5	16.5±0.5
CR1225	Embossed	2K	12mm	7 inch	178.5±1.5	$60^{+1/-0}$	13.0±0.5	13.0±0.5	15.5±0.5
CR0612	Paper	5K	8mm	7 inch	178.5±1.5	$60^{+1/-0}$	13.0±0.2	9.0±0.5	12.5±0.5

Paper Tape Specifications



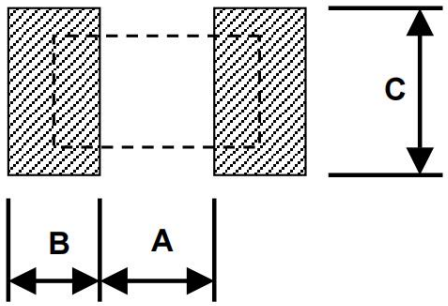
Type	A(mm)	B(mm)	W(mm)	E(mm)	F(mm)	P_0(mm)	P_1(mm)	P_2(mm)	ΦD_0(mm)	T(mm)
CR01005	0.24±0.05	0.45±0.05	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.50+0.1,-0	0.40±0.10
CR0201	0.38±0.05	0.68±0.05	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.50+0.1,-0	0.42±0.20
CR0402	0.65±0.10	1.15±0.10	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.50+0.1,-0	0.45±0.10
CR0603	1.10±0.10	1.90±0.10	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.70±0.10
CR0805	1.60±0.10	2.40±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10
CR1206	1.90±0.10	3.50±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10
CR1210	2.90±0.10	3.50±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10
CR0612	1.90±0.10	3.50±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10

Embossed Plastic Tape Specifications



Type	A(mm)	B(mm)	W(mm)	E(mm)	F(mm)	P_0(mm)	P_1(mm)	P_2(mm)	ΦD0 (mm)	T(mm)
CR2010	2.8±0.10	5.5±0.10	12.0±0.30	1.75±0.10	5.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1, -0	1.2^{+0}
CR2512	3.5±0.10	6.7±0.10	12.0±0.30	1.75±0.10	5.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1, -0	1.2^{+0}
CR1225	3.38±0.10	6.68±0.10	12.0±0.30	1.75±0.10	5.5±0.10	4.00±0.10	4.00±0.10	2.00±0.05	1.55+0.05	1.45±0.20

Recommend Land Pattern



Type	A(mm)	B(mm)	C(mm)
CR01005	0.14	0.18	0.25
CR0201	0.30	0.25	0.30
CR0402	0.50	0.45	0.60
CR0603	0.90	0.60	0.90
CR0805	1.20	0.70	1.30
CR1206	2.00	0.90	1.60
CR1210	2.00	0.90	2.80
CR2010	3.80	0.90	2.80
CR2512	3.80	1.60	3.50
CR1225	1.20	2.00	7.00
CR0612	0.70	1.20	3.20

Marking

No Marking for 01005, 0201 and 0402

Jumper for all: Letter "0"

1% for 0805/1206/1210/2010/2512/1225/0612: 4 digits marking

Example:

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

5% for 0603/0805/1206/1210/2010/2512/1225/0612: 3 digits marking in E24

Example:

101=100Ω 102=1KΩ (1st and 2nd are E24 code and 3rd code is multiplier)

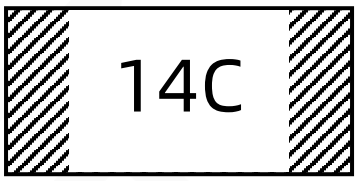
E24 code	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47	51	56	62	68	75	82	91

1% for 0603(E24):

3 digits marking in E24, When the E24 and E96 are the same resistance, this marking in E96

Example:

01A= 100Ω 05C=11KΩ 123=12KΩ 273=27KΩ



1% for 0603: 3 digits marking in E96

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

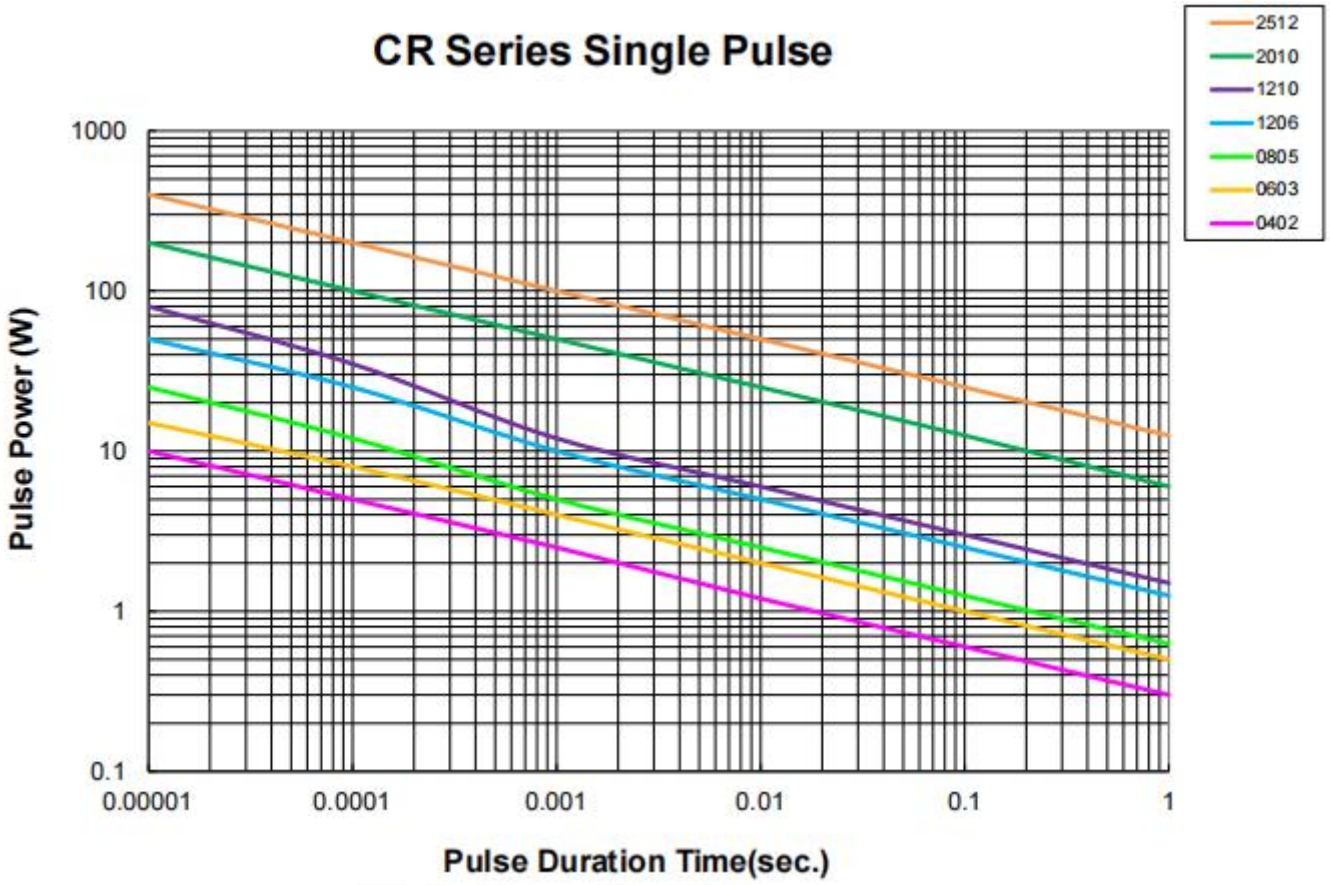
Marking Table

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	30	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

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

Pulse withstanding capacity

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.



Note:The limit of the applicable voltage is the max. overload voltage. Please consult us about the resistance characteristic when pulse is applied continuously. This data is a reference value, please be sure to test the products on the actual circuit before you use them.

Storage Temperature: 15~28℃; Humidity < 80%RH

REVISION HISTORY:

REVISION	DATE	DESCRIPTION	Changer	Reviewer
Version AO	2022-10-25	① rule change	YongKangHuang	YiWenLen
Version B0	2023-07-04	① Naming rule changes	YongKangHuang	YiWenLen
Version B1	2025-02-17	①Updated specification content and templates	YongKangHuang	YiWenLen