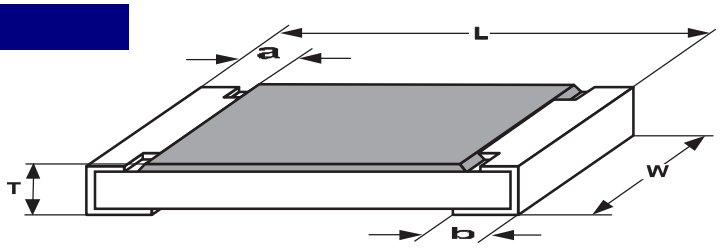
CURRENT SENSING THICK FILM CHIP RESISTORS

(RPC / RPL / RPCH SERIES)

Applications

* Switching model power supply
* Communication equipment
* Consumer Electrical, Electronic device
* Home Appliance: Air conditioner, Refrigerator
* Computer & relative products: Main board

Dimension Specifications



Style				Dimension mm				
				L	W	T	a	b
RPC-04	RPL-04	RPCH-04	0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.20±0.10
RPC-06	RPL-06	RPCH-06	0603	1.60±0.10	0.80±0.10	0.45±0.15	0.30±0.20	0.30±0.20
RPC-10	RPL-10	RPCH-10	0805	2.00±0.10	1.25±0.10	0.50±0.15	0.35±0.20	0.40±0.20
RPC-18	RPL-18	RPCH-18	1206	3.10±0.10	1.60±0.10	0.55±0.15	0.50±0.20	0.50±0.20
RPC-20	RPL-20	RPCH-20	1210	3.10±0.10	2.50±0.15	0.55±0.15	0.50±0.20	0.50±0.20
RPC-22	RPL-22	RPCH-22	2010	5.00±0.20	2.50±0.15	0.55±0.10	0.60±0.25	0.60±0.25
RPC-24	RPL-24	RPCH-24	2512	6.30±0.20	3.20±0.15	0.55±0.10	0.60±0.25	0.60±0.25

RPC SERIES (High Power Electrical Specifications)

Style (Size)		Power rating at 70˚C	Max working voltage	Max overload voltage	Resistance tolerance %	TCR ppm/˚C	Resistance range Min.	Resistance range Max.
RPC-04	0402	1/10W	50V	100V	±1%F ±5%J	±400ppm	1Ω	10Ω
						±100ppm	10Ω	10MΩ
						* ±200ppm	10.1MΩ	30 MΩ
RPC-06	0603	1/8W	75V	150V		±400ppm	1Ω	10Ω
						±100ppm	10Ω	10MΩ
						* ±200ppm	10.1MΩ	30 MΩ
RPC-10	0805	1/4W	150V	300V		±400ppm	1Ω	10Ω
						±100ppm	10Ω	10MΩ
						* ±200ppm	10.1MΩ	30 MΩ
RPC-18	1206	1/2W	200V	400V		±400ppm	1Ω	10Ω
RPC-20	1210	2/3W				±100ppm	10Ω	10MΩ
RPC-22	2010	1W				* ±200ppm	10.1MΩ	30 MΩ
RPC-24	2512	2W						

* High Power High-Resistance : 10.1ΩM ~ 30MΩ; Tol. J 5% & F 1%; TCR: ±200 ppm

RoHS compliant

CINETECH SYMBOL OF QUALITY

RPL SERIES (High Power Low Ohm Chip Resistors)

Style (Size)		Rated Power at 70℃	Max Working Voltage	Max Overload Voltage	Resistance tolerance %	TCR ppm/˚C	Resistance Range (mΩ) Min.	Max.
RPL-04	0402	1/10W	0.32V	0.79 V	±1%F ±5%J	±800ppm ±500ppm	450mΩ 100mΩ	1000mΩ 976mΩ
RPL-06	0603	1/8W	0.35V	0.88V		±1200ppm ±800ppm ±500ppm	20mΩ 100mΩ 100mΩ	47mΩ 330mΩ 976mΩ
RPL-10	0805	1/4W	0.50V	1.25V		±1500ppm ±1200ppm ±800ppm ±500ppm	10mΩ 20mΩ 50mΩ 100mΩ	18mΩ 47mΩ 100mΩ 976mΩ
RPL-18	1206	1/2W	0.71V	1.77V				
RPL-20	1210	2/3W	0.81V	2.03V		±800ppm ±500ppm	50mΩ 100mΩ	91mΩ 976mΩ
RPL-22	2010	1W	1.0V	2.5V		±1500ppm ±800ppm ±500ppm	10mΩ 50mΩ 100mΩ	18mΩ 100mΩ 976mΩ
RPL-24	2512	2W	1.41V	3.54V				

* High Power Low-TCR ±100ppm available for resistance more than 100mΩ upon request.

RPCH SERIES (Ultra High Power Chip Resistors)

Style (size)		Rated Power at 70℃	Max Working Voltage	Max Overload Voltage	T.C.R ppm/℃	Resistance Range ±0.5%(D)	±1%(F), ±5%(J) Min.	Max.
RPCH-04	0402	1/5W	50V	100V	±400ppm	--	1 Ω	10Ω
					±100ppm	10Ω~1MΩ	10Ω	10MΩ
RPCH-06	0603	1/3W	150V	200V	±400ppm	--	1 Ω	10Ω
					±100ppm	10Ω~1MΩ	10Ω	10MΩ
RPCH-10	0805	1/2W	200V	300V	±400ppm	--	1 Ω	10Ω
					±100ppm	10Ω~1MΩ	10Ω	10MΩ
RPCH-18	1206	3/4W	200V	400V	±400ppm	--	1 Ω	10Ω
					±100ppm	10Ω~1MΩ	10Ω	10MΩ
RPCH-20	1210	1W	200V	400V	±400ppm	--	1 Ω	10Ω
					±100ppm	10Ω~1MΩ	10Ω	10MΩ
RPCH-22	2010	1.5W	200V	400V	±400ppm	--	1 Ω	10Ω
					±150ppm	10Ω~1MΩ	10Ω	10MΩ
RPCH-24	2512	3W	250V	500V	±400ppm	--	1 Ω	10Ω
					±150ppm	10Ω~1MΩ	10Ω	10MΩ

Operating Voltage=$\sqrt{(P*R)}$ or Max. Operating Voltage listed above, whichever is lower

Overload Voltage=2.5*$\sqrt{(P*R)}$ or Max. Overload Voltage listed above, whichever is lower.

Operating Temperature Range: -55℃~ +155℃

RoHS compliant

CINETECH SYMBOL OF QUALITY

RPC Series - Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R.)	JIS- C- 5201-1 4.8 IEC-60115-1 4.8	At 25 / -55℃ and 25℃/ +125℃,25℃ is the reference temperature	Refer to RPC type
Insulation Resistance	JIS- C- 5201-1 4.6 IEC-60115-1 4.6	Apply 100VDC for 1 minute	≧10G Ω
Short Time Overload	JIS- C- 5201-1 4.13 IEC-60115-1 4.13	High Power: 2.5 times RCWV or Max Overload voltage whichever is less for 2 Sec .Jumper: Over load current for 5 sec. 0402=4.5A; 0603=6.3A; 0805=8.8A; 1206=11A; 1210=13A; 1812=15A; 2512=20A	F 1% and below : ± (1.0% + 0.05Ω) J 5% : ± (2.0 %+ 0.10Ω) Jumper: Max. 0.02Ω after test.
Leaching	JIS- C- 5201-1 4.18 IEC-60068-2-58 8.2.1	260 ± 5℃ for 30 seconds.	Individual leaching area ≦5%, Total leaching area ≦10%
Resistance to Soldering Heat	JIS -C- 5201-1 4.18 IEC-60115-1 4.18	260 ± 5℃ for 10 seconds.	F 1% and below : ± (0.5% + 0.05Ω) J 5% : ± (1.0% + 0.05Ω)
Rapid Change of Temperature	JIS -C- 5201-1 4.19 IEC-60115-1 4.19	-55℃ to +155℃,5 cycles	F 1% and below : ± (0.5% + 0.05Ω) J 5% : ± (1.0 % + 0.10Ω)
Resistance to Solvent	JIS -C- 5201-1 4.29	The tested resistor be immersed into isopropyl alcohol of 20~25 ℃for 60 secs. Then the resistor is left in the room for 48 hrs.	F 1% and below : ± (0.5% + 0.05Ω) J 5% : ± (0.5% + 0.05Ω) Jumper: Max. 0.02Ω after test.
Damp Heat with Load	JIS -C- 5201-1 4.24 IEC-60115-1 4.24	40 ±2℃, 90~95% R.H RCWV or Max.working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"	F 1% and below : ± (1.0% + 0.05Ω) J 5% : ± (2.0% + 0.05Ω) value ＜1Ω : ± (2.0% + 0.05Ω) Jumper: Max. 0.05Ω after test.
Load Life (Endurance)	JIS -C- 5201-1 4.25 IEC-60115-1 4.25.1	70 ±2℃,RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"	F 1% and below : ± (1.0% + 0.05Ω) J 5% : ± (3.0% + 0.10Ω) value ＜1Ω : ± (3.0% + 0.10Ω) Jumper: Max. 0.05Ω after test.
Bending Strength	JIS -C- 5201-1 4.33 IEC-60115-1 4.33	Bending once for 60 seconds D: 0201 ~ 0805= 3mm; 1206 ,1210= 3mm 2010、2512 =2mm	F 1% and below : ± (1.0% + 0.05Ω) J 5% : ± (1.0 %+ 0.50Ω)

Type	0402	0603	0805	1206	1210	2010	2512
Jumper Resistance value	20 mΩ Max.						
Jumper Rated Current	2A	2.5A	3.5A	5A	6A	7A	10A
Max. Over load Current ＜1 second and 1 times	6A	9A	13A	16A	19A	22A	30A

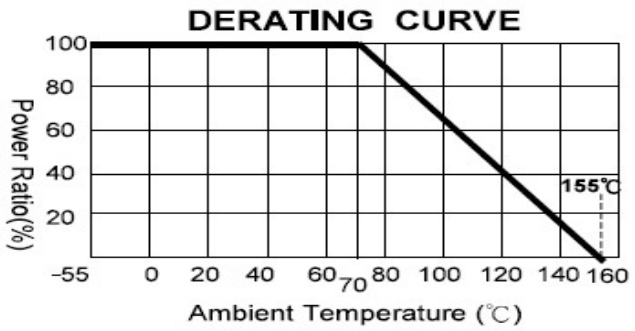
RoHS compliant

CINETECH SYMBOL OF QUALITY

RPL / RPCH Series - Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R.)	JIS- C- 5201-1 4.8 IEC-60115-1 4.8	At 25 / -55℃ and 25℃/ +125℃,25℃ is the reference temperature	Refer to RPL / RPCH type
Insulation Resistance	JIS- C- 5201-1 4.6 IEC-60115-1 4.6	Apply 100VDC for 1 minute	≧10G Ω
Short Time Overload	JIS- C- 5201-1 4.13 IEC-60115-1 4.13	High power: RCWV*2.5 or Max. Overload voltage whichever is less for 2 Sec Ultra Power: 5 x Rated Power or Max Overload voltage whichever is less for 5 Sec.	F 1% and below : ± (1.0% + 0.05Ω) J 5% : ± (2.0 %+ 0.10Ω)
Leaching	JIS- C- 5201-1 4.18 IEC-60068-2-58 8.2.1	260 ± 5℃ for 30 seconds.	Individual leaching area ≦5%, Total leaching area ≦10%
Resistance to Soldering Heat	JIS -C- 5201-1 4.18 IEC-60115-1 4.18	260 ± 5℃ for 10 seconds.	F 1% and below : ± (0.5% + 0.05Ω) J 5% : ± (1.0% + 0.05Ω)
Rapid Change of Temperature	JIS -C- 5201-1 4.19 IEC-60115-1 4.19	-55℃ to +155℃,5 cycles	F 1% and below : ± (0.5% + 0.05Ω) J 5% : ± (1.0 % + 0.10Ω)
Resistance to Solvent	JIS -C- 5201-1 4.29	The tested resistor be immersed into isopropyl alcohol of 20~25 ℃for 60 secs. Then the resistor is left in the room for 48 hrs.	F 1% and below : ± (0.5% + 0.05Ω) J 5% : ± (0.5% + 0.05Ω)
Damp Heat with Load	JIS -C- 5201-1 4.24 IEC-60115-1 4.24	40 ±2℃, 90~95% R.H RCWV or Max.working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"	F 1% and below : ± (1.0% + 0.05Ω) J 5% : ± (2.0% + 0.05Ω) value ＜1Ω : ± (2.0% + 0.05Ω)
Load Life (Endurance)	JIS -C- 5201-1 4.25 IEC-60115-1 4.25.1	70 ±2℃,RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"	F 1% and below : ± (1.0% + 0.05Ω) J 5% : ± (3.0% + 0.10Ω) value ＜1Ω : ± (3.0% + 0.10Ω)
Bending Strength	JIS -C- 5201-1 4.33 IEC-60115-1 4.33	Bending once for 60 seconds D: 0201 ~ 0805= 3mm; 1206 ,1210= 3mm 2010、2512 =2mm	F 1% and below : ± (1.0% + 0.05Ω) J 5% : ± (1.0 %+ 0.50Ω)

Derating Curve



The Operating Temperature Range: -55℃ ~ +155℃. Powr Rating is in the case based on continuous full-load at ambient temperature of 70℃. For operaton at ambient temperature in excess of 70℃, the load should be derated in accordance with figure or derating Curve.

* Rate voltage

Resistance range: ≧1Ω

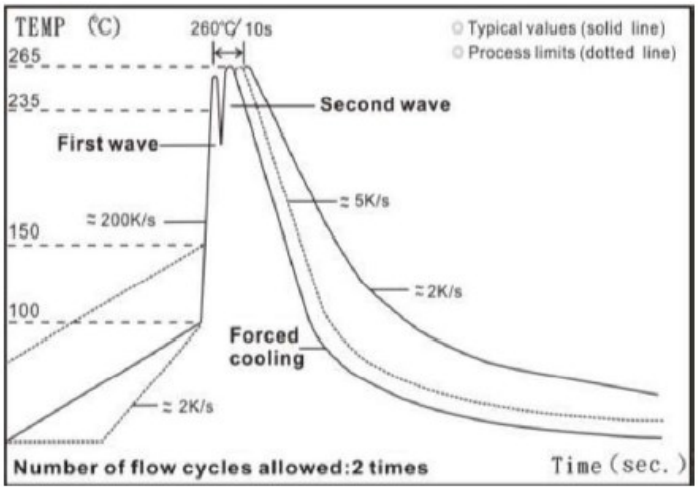
Rated voltaget: The resistor shall have a DC continuous working voltaget or a RMS AC(ms) continuous working voltage at commercial - line frequency and wave form corresponding to the power rating, as determined formula as following:

$$E(RCWV)=\sqrt{P\times R}$$

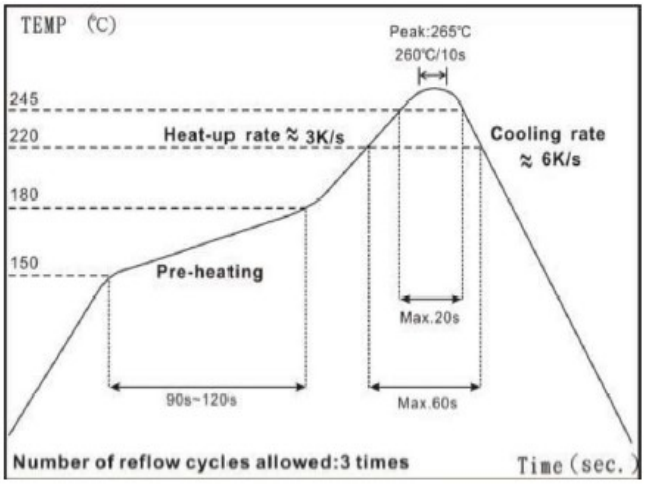
E=Rated voltage(V)
P=Power rating(W)
R=Nominal resistance(Ω)

Recommended Customer Soldering Parameters

∗ Wave solder Temperature Condition



∗ Solder reflow Temperature Condition

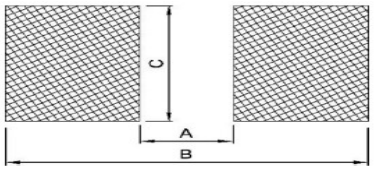


∗ Rework Temperature (hot air equipment: 350℃, 3~5 seconds

∗ Recommended reflow methods

IR, vapor phase oven, hot air oven
If reflow temp. exceed the recommended profile, devices may not meet the performance requirements.

∗ Recommend Land Pattern Design



Type	0402	0603	0805	1206	1210	2010	2512
A	0.60	0.85	1.30	2.20	2.00	3.80	4.90
B	1.60	2.40	2.90	4.20	4.40	6.60	8.10
C	0.70	1.00	1.40	1.70	2.70	2.70	3.40

RoHS compliant

CINETECH SYMBOL OF QUALITY

Marking

* General Resistance Codes

0201, 0402 no marking

0603: 3 digits code

0805~2512 5%

0805~2512 1%

code	R Value	code	R Value	code	R Value	code	R Value	code	R Value	code	R Value	code	R Value	code	R 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	65	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:

$Y=10^{-2}$ $X=10^{-1}$ $A=10^{0}$ $B=10^{1}$ $C=10^{2}$ $D=10^{3}$ $E=10^{4}$ $F=10^{5}$

* m Ω Resistance Codes

0402 no marking

0603 ~ 2512 5%
3 digits code

0805~2512 1%
4 digits code

E-24 value	Code		Example	
	5%	1%	5%	1%
10mΩ ~ 99mΩ	R01	0R01	R01=10mΩ	0R01=10mΩ
100mΩ ~ 990mΩ	R10	0R10	R10=100mΩ	0R10=100mΩ

Parts Number system

RPC -

Type

RPC Series-
Standard Resistances

RPL Series-
Low ohmic Chip Resisor

RPCH Series-
Ultra High Power Chip Resisor

10 -

Size

04=0402
06=0603
10=0805
18=1206
20=1210
22-2010
24=2512

102

Resistance

3 Digits: for 5%
10K=103
100K=104
R01=10mΩ
R10=100mΩ

4 Digits: for 1%
10K=1002
100K=1003
0R01=10mΩ
0R10=100mΩ

J

Tolerance

J=± 5%
F=± 1%

R

Standard Packing

R=Paper tape reel
10Kpcs/Reel
size: 0402
5Kpcs/Reel
size: 0603~1206
K=Embossed plastic tape reel
4Kpcs/Reel
size: 2010~2512

RoHS compliant

CINETECH SYMBOL OF QUALITY