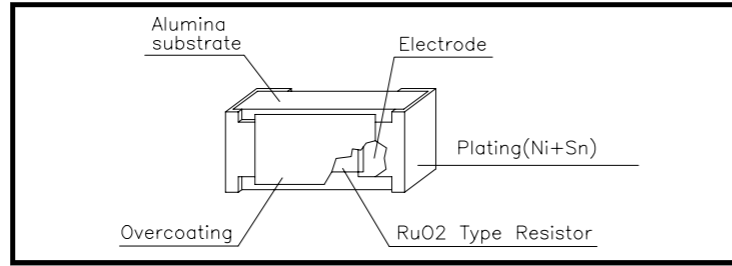


Construction



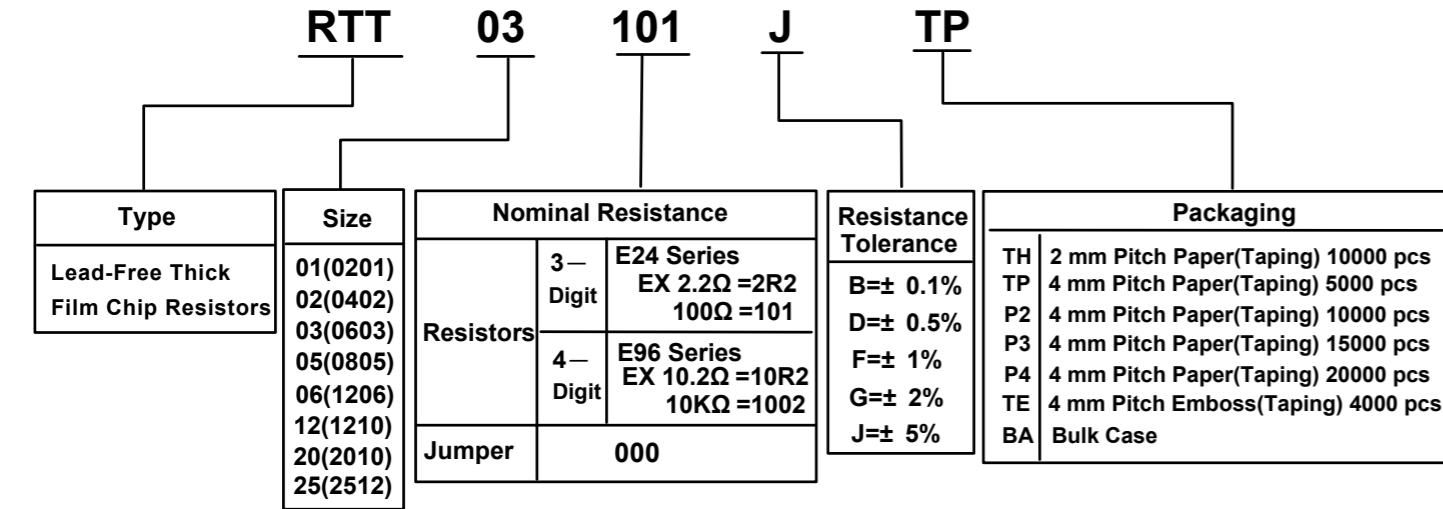
Feature

- 1.Small size and light weight.
- 2.High reliability and stability.
- 3.Lower assembly cost.
- 4.Apply to all kinds of SMT process.
- 5.Apply to Pb & Pb-Free Wave Solder & Reflow Solder.
- 6.Comply with RoHS.

Application

- 1.Computer application, NB, MB, add-on card harddisk....
- 2.Mobile phone, Telecom....
- 3.Consumer electrical equipment, PDA,Digital Camera....
- 4.Battery changer, DC-DC power converter
- 5.Automotive

Type Designation



Dimensions

Type	Dimensions	L	W	H	L1	L2
RTT01 (0201)		0.60± 0.03	0.30± 0.03	0.23± 0.03	0.12± 0.05	0.15± 0.05
RTT02 (0402)		1.00± 0.10	0.50± 0.05	0.30± 0.05	0.20± 0.10	0.25± 0.10
RTT03 (0603)		1.55± 0.10	0.80 <sup>+0.15</sup> <sub>-0.05</sub>	0.45± 0.10	0.30± 0.15	0.30± 0.15
RTT05 (0805)		2.00± 0.10	1.25± 0.10	0.50± 0.10	0.35± 0.20	0.35± 0.15
RTT06 (1206)		3.05± 0.10	1.55± 0.10	0.55 <sup>+0.10</sup> <sub>-0.05</sub>	0.45± 0.20	0.35± 0.15
RTT12 (1210)		3.05± 0.10	2.55± 0.10	0.55± 0.10	0.50± 0.20	0.50± 0.20
RTT20 (2010)		5.00± 0.20	2.50± 0.20	0.55± 0.10	0.60± 0.20	0.60± 0.20
RTT25 (2512)		6.30± 0.20	3.20± 0.20	0.55± 0.10	0.60± 0.20	0.60± 0.20

Standard Electrical Specifications

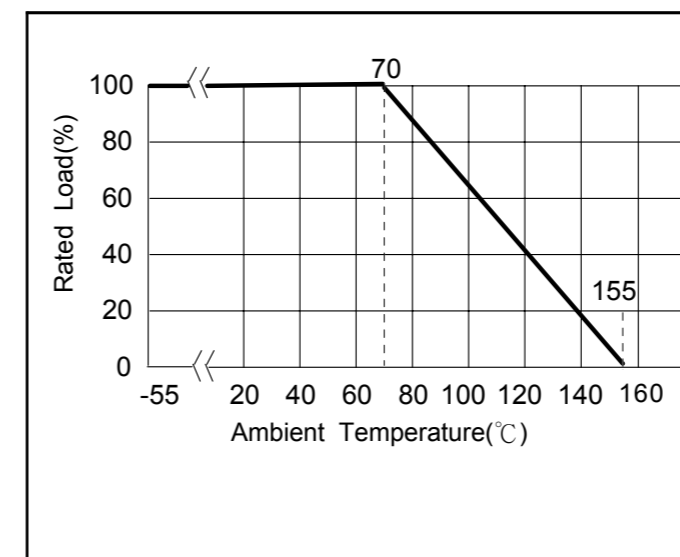
Type	Rated Power at 70°C	Max. Working Voltage	Max. Overload Voltage	T.C.R. (ppm/°C)	Resistance Range					Jumper Rated Current	Jumper Resistance Value
					B(± 0.1%) E-96	D(± 0.5%) E-96	F(± 1%) E-96	G(± 2%) E-24	J(± 5%) E-24		
RTT01 (0201)	1/20 W	25V	50V	± 600 ± 250	-----	-----	1Ω~24.9Ω 25Ω~10MΩ	-----	1Ω~24.9Ω 25Ω~10MΩ	0.5A	50mΩ MAX
RTT02 (0402)	1/16 W	50V	100V	+500 -200 ± 200	-----	10Ω~99Ω 100Ω~1MΩ	1Ω~9.9Ω 10Ω~1MΩ	1Ω~9.9Ω 10Ω~1MΩ	1Ω~9.9Ω 10Ω~20MΩ	1A	50mΩ MAX
RTT03 (0603)	1/10 W	75V	150V	± 100 ± 200	-----	100Ω~1MΩ 100Ω~1MΩ	33Ω~1MΩ 1Ω~99Ω	-----	1Ω~10MΩ 1Ω~20MΩ	1A	50mΩ MAX
RTT05 (0805)	1/8 W	150V	300V	± 100 ± 200	-----	100Ω~1MΩ 100Ω~1MΩ	33Ω~1MΩ 1Ω~32Ω 1.1M~10M	-----	1Ω~10MΩ 1Ω~20MΩ	2A	50mΩ MAX
RTT06 (1206)	1/4 W	200V	400V	± 100 ± 200	-----	100Ω~1MΩ 100Ω~1MΩ	33Ω~1MΩ 1Ω~32Ω 1.1M~10M	-----	1Ω~10MΩ 1Ω~20MΩ	2A	50mΩ MAX
RTT12 (1210)	1/3 W	200V	400V	± 100 ± 200 ± 400	-----	100Ω~1MΩ 100Ω~1MΩ	33Ω~1MΩ 10Ω~32Ω 1.1M~10M	-----	1Ω~9.9Ω 1Ω~9.9Ω 1Ω~9.9Ω	2A	50mΩ MAX
RTT20 (2010)	3/4 W	200V	400V	± 100 ± 200 ± 400	-----	-----	-----	-----	10Ω~1MΩ 10Ω~1MΩ 1Ω~9.9Ω	2A	50mΩ MAX
RTT25 (2512)	1W	200V	400V	± 100 ± 200 ± 400	-----	-----	-----	-----	10Ω~1MΩ 10Ω~1MΩ 1Ω~9.9Ω	2A	50mΩ MAX

Operating Temperature Range: -55°C ~ +155°C (RTT01: -55°C ~ +125°C)

Taping Package

TYPE	Tape Width	Taping Package(pcs/reel)											
		Paper Tape								Plastic Tape			
		2mm Pitch				4mm Pitch				4mm Pitch			
		TH	H2	H3	H4	TP	P2	P3	P4	TE	E2	E3	E4
0201	8 mm	10,000	20,000	30,000	40,000	-----	-----	-----	-----	-----	-----	-----	-----
0402	8 mm	10,000	20,000	30,000	40,000	-----	-----	-----	-----	-----	-----	-----	-----
0603	8 mm	-----	-----	-----	-----	5,000	10,000	15,000	20,000	-----	-----	-----	-----
0805	8 mm	-----	-----	-----	-----	5,000	10,000	15,000	20,000	-----	-----	-----	-----
1206	8 mm	-----	-----	-----	-----	5,000	10,000	15,000	20,000	-----	-----	-----	-----
1210	8 mm	-----	-----	-----	-----	5,000	10,000	15,000	20,000	-----	-----	-----	-----
2010	12 mm	-----	-----	-----	-----	-----	-----	-----	-----	4,000	8,000	12,000	16,000
2512	12 mm	-----	-----	-----	-----	-----	-----	-----	-----	4,000	8,000	12,000	16,000

Power Derating Curve



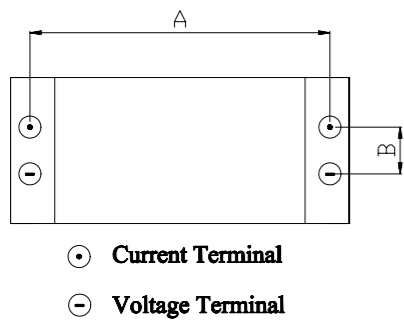
Marking

FOR E-24&E-96  
 ◎2%,5% 3 digits indication  
 first 2 digits are significant figures  
 3rd digit is multiplier(10<sup>x</sup>)  
 EX. Marking --> 563  
 56 × 10<sup>3</sup> = 56000Ω = 56KΩ

◎0.1%、0.5%、1% 4 digits indication  
 first 3 digits are significant figures 4th digit is multiplier (10<sup>x</sup>)  
 EX. Marking --> 3922  
 392 × 10<sup>2</sup>=39200Ω=39.2KΩ

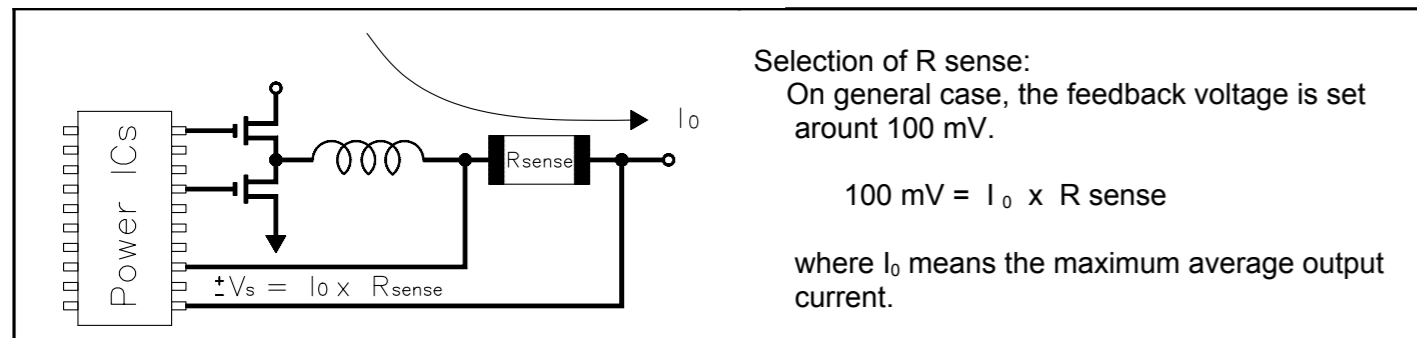
FOR RTT03 0.1%、0.5%、1%(E-96)  
 ◎3 digit indication  
 first 2 digits are significant for E-96 Part marking scheme.  
 3rd digit is multiplier:  
 Y=10<sup>-2</sup> X=10<sup>-1</sup> A=10<sup>0</sup> B=10<sup>1</sup>  
 C=10<sup>2</sup> D=10<sup>3</sup> E=10<sup>4</sup> F=10<sup>5</sup>  
 Type RTT01,02:No marking Code

Measurement Point For Chip Resistors



DIM TYPE	A	B
RTT01	0.45± 0.05	0.22 ± 0.05
RTT02	0.80± 0.05	0.35 ± 0.05
RTT03	1.35± 0.05	0.35 ± 0.05
RTT05	1.80 ± 0.05	0.35 ± 0.05
RTT06	2.90 ± 0.05	0.35 ± 0.05
RTT12	2.90 ± 0.05	0.35 ± 0.05
RTT20	4.50 ± 0.05	1.15 ± 0.05
RTT25	5.90 ± 0.05	1.60 ± 0.05

Function For Low-Ohmic Chip Resistors



Standard Resistance Values

For 2%,5%(E-24)

For 1%(E-96)

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

100	102	105	107	110	113	115	118	121	124	127	130
133	137	140	143	147	150	154	158	162	165	169	174
178	182	187	191	196	200	205	210	215	221	226	232
237	243	249	255	261	267	274	280	287	294	301	309
316	324	332	340	348	357	365	374	383	392	402	412
422	432	442	453	464	475	487	499	511	523	536	549
562	576	590	604	619	634	649	665	681	698	715	732
750	768	787	806	825	845	866	887	909	931	953	976

Alternate Marking Method

For RTT03 1%(E-96)

Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value
1	100	13	133	25	178	37	237	49	316	61	422	73	562	85	750		
2	102	14	137	26	182	38	243	50	324	62	432	74	576	86	768		
3	105	15	140	27	187	39	249	51	332	63	442	75	590	87	787		
4	107	16	143	28	191	40	255	52	340	64	453	76	604	88	806		
5	110	17	147	29	196	41	261	53	348	65	464	77	619	89	825		
6	113	18	150	30	200	42	267	54	357	66	475	78	634	90	845		
7	115	19	154	31	205	43	274	55	365	67	487	79	649	91	866		
8	118	20	158	32	210	44	280	56	374	68	499	80	665	92	887		
9	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		

Y=10<sup>-2</sup> X=10<sup>-1</sup> A=10<sup>0</sup> B=10<sup>1</sup> C=10<sup>2</sup> D=10<sup>3</sup> E=10<sup>4</sup> F=10<sup>5</sup>

Reliability Test

Item	Specification			Test Method
	R: ≥ 1Ω		R: < 1Ω	
	0.5%、1%	2%、5%	1%、2%、5%	
Temperature Coefficient of Resistance	Within the specification of TCR			JIS-C5202-5.2 $TCR \text{ (ppm/}^\circ\text{C)} = \frac{(R2 - R1)}{R1 (T2 - T1)} \times 10$ R1: Resistance at room temperature R2: Resistance at -55°C or +125°C T1: Room temperature T2: Temperature -55°C or +125°C (RTT01 at 125 °C)
Short Time Overload	± (1.0%+0.05Ω)	± (2.0%+0.10Ω)	± (2.0%+0.001Ω)	JIS-C5202-5.5 Apply 2.5 times rated voltage or Max. Overload Voltage for 5 seconds.
Insulation Resistance	≥ 10 <sup>9</sup> Ω			JIS-C5202-5.6 Put the resistor in the fixture, add 100 VDC in +,- terminal for 60 seconds then measured the insulation resistance.
Dielectric Withstand Voltage	No short or burned on the appearance			JIS-C5202-5.7 Apply 500VAC for 1min.(RTT02,03 300VAC).
Intermittent Overload	± (5.0%+0.10Ω)	± (5.0%+0.001Ω)		JIS-C5202-5.8 Apply rated voltage 2.5 times, 1sec ON, 25sec OFF, 10000 test cycle.
Core Body Strength	± (1.0%+0.05Ω)	± (1.0%+0.001Ω)		JIS-C5202-6.1.4 Applied R0.5 test probe at its central part then pushing 1Kgf force on the sample for 10 sec.
Terminal Strength	No evidence of mechanical damage			JIS-C5202-6.1.4 Apply 5N pushing force for 10sec.
Resistance to Solvent	± (0.5%+0.05Ω)	± (1.0%+0.001Ω)		JIS-C5202-6.9 Immersed into isopropyl alcohol of 20 ~ 25°C for 60 seconds.
Resistance to Soldering Heat	± (1.0%+0.05Ω)	± (1.0%+0.001Ω)		By SONY SS-00254-5, JIS-C5202-6.10
Solderability	Coverage ≥ 95%			By SONY SS-00254-2, JIS-C5202-6.11
Joint strength of solder	± (1.0%+0.05Ω)	± (1.0%+0.001Ω)		By SONY SS-00254-7, JIS-C5202-6.1.4 After application of temperature cycle, adhesion or bending load should be 50% or more of initial strength.
Leaching Test	Coverage ≥ 95%			By SONY SS-00254-9
Vibration	± (0.5%+0.05Ω)	± (1.0%+0.05Ω)	± (1.0%+0.001Ω)	JIS-C5202-6.3 Frequency range: 10 Hz to 55Hz to 10Hz/1min. Amplitude: 1.5 mm This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (a total of 6 hrs).
Resistance to Dry Heat	± (1.0%+0.05Ω)	± (2.0%+0.10Ω)	± (1.0%+0.001Ω)	JIS-C5202-7.2 1000 Hrs at 155°C. (RTT01 at 125 °C)
Thermal Shock	± (0.5%+0.05Ω)	± (1.0%+0.05Ω)	± (1.0%+0.001Ω)	MIL-STD 202 Method 107 Cycle between -55°C and +125°C 15 minute for 300 cycles.
Loading Life in Moisture	± (0.5%+0.05Ω)	± (2.0%+0.10Ω)	± (2.0%+0.001Ω)	JIS-C5202-7.9 40± 2°C, 90~95 %RH, 1000Hrs at RCWV, 1.5Hrs ON, 0.5Hrs OFF.
Load Life	± (1.0%+0.05Ω)	± (3.0%+0.10Ω)	± (2.0%+0.001Ω)	JIS-C5202-7.10 70°C, 1000Hrs at RCWV, 1.5Hr ON, 0.5Hr OFF
Low Temperature Operation	± (0.5%+0.05Ω)	± (1.0%+0.05Ω)	± (1.0%+0.001Ω)	MIL-R-5532D 4.7.4 1 Hrs, -55°C, Followed by 45 minutes of RCWV.
Whisker Test	Max 50 μm			By SONY SS-00254-8, JIS-C5202

RCWV=Rated Continuous Working Voltage