Data Sheet

Customer:	
Product:	Current Sensing Thick Film Chip Resistor - RS Series
Size:	0402/0603/0805/1206/1210/2010/2512
Issued Date:	26-Aug-25
Edition:	REV.B7

RoHS Compliant

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26-Aug-25	26-Aug-25	26-Aug-25		
Alice Hsiao	***Susan Huang***	***Susan Huang***		

Current Sensing Thick Film Chip Resistor



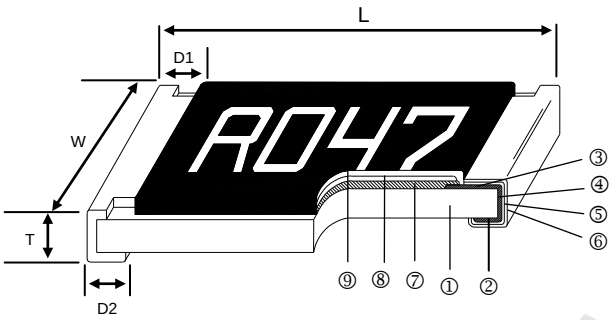
Scope

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

Features

—Low inductance
—Highly reliable multilayer electrode construction
—Higher component and equipment reliability
—Reduced size of final equipment reliability
—RoHS Compliance
—MSL: Level 1

Construction



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

Applications

—Power Management Applications
—Switching Power Supply
—Over Current Protection in Audio Application
—Voltage Regulation Module (VRM)
—DC-DC Converter, Battery Pack, Charger, Adaptor
—Disk Driver

Dimensions

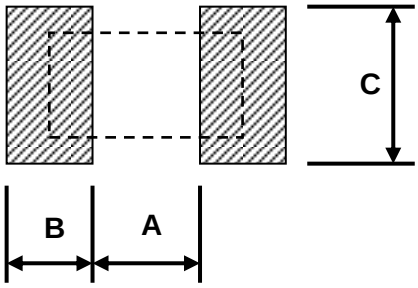
Type	Size (Inch)	L (mm)	W (mm)	T (mm)	D1 (mm)	D2 (mm)	Weight (g) (1000pcs)
RS-02	0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10	0.620
RS-03	0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20	2.042
RS-05	0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.40±0.20	4.368
RS-06	1206	3.10±0.10	1.55±0.10	0.55±0.10	0.50±0.25	0.50±0.20	8.947
RS-10	1210	3.10±0.10	2.60±0.15	0.55±0.10	0.50±0.25	0.50±0.20	15.959
RS-0A	2010	5.00±0.10	2.50±0.15	0.55±0.10	0.60±0.25	0.50±0.20	24.241
RS-12	2512	6.35±0.10	3.10±0.15	0.55±0.10	0.60±0.25	0.50±0.20	39.448

■Part Numbering

Part Number：RS-03FL7-0R047

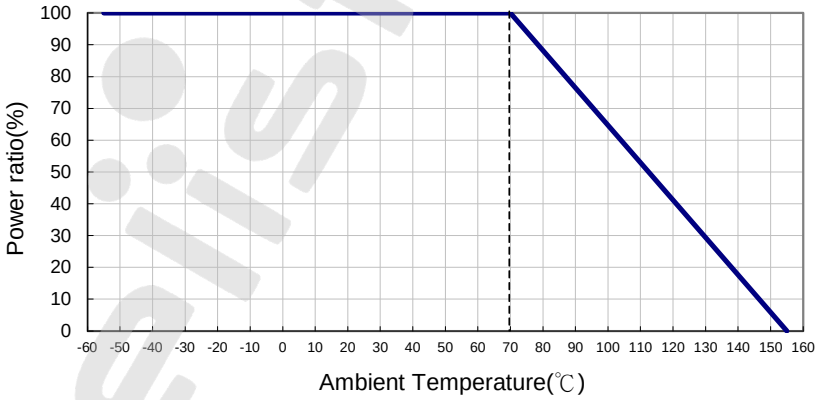
RS-	03	F	L	7	-	0	R	0	4	7
Product Type	Dimensions	Resistance Tolerance	Function Code	Packaging Code	Resistance					
RS	02: 0402 03: 0603 05: 0805 06: 1206 10: 1210 0A: 2010 12: 2512	F: ±1% J: ±5%	L: Standard P: High Power	4: 7” Reel 4Kpcs 6: 7” Reel 10Kpcs 7: 7” Reel 5Kpcs 9: 10” Reel 8Kpcs A: 10” Reel 10Kpcs B: 10” Reel 20Kpcs C: 13” Reel 40Kpcs D: 13” Reel 20Kpcs F: Bulk	- 0R047: 0.047Ω - - - 0R1: 0.1Ω “-“ to fill up 6 spaces					

■Recommend Land Pattern

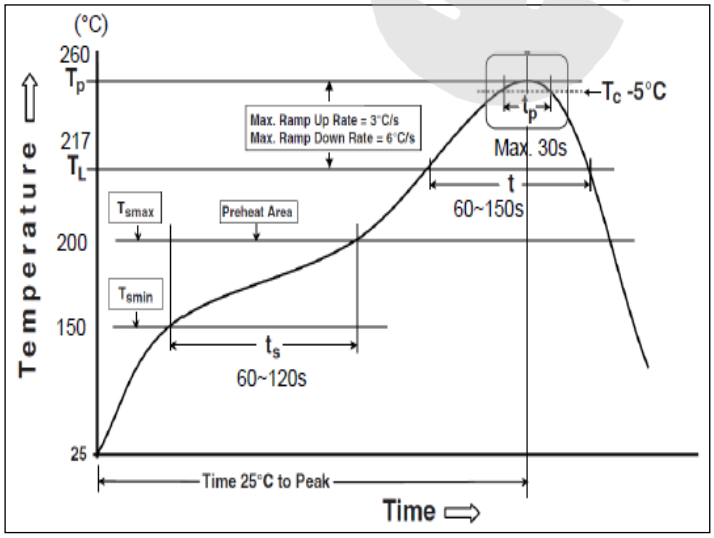


Type	A (mm)	B (mm)	C (mm)
RS-02	0.50	0.45	0.60
RS-03	0.90	0.60	0.90
RS-05	1.20	0.70	1.30
RS-06	2.00	0.90	1.60
RS-10	2.00	0.90	2.80
RS-0A	3.80	0.90	2.80
RS-12	3.80	1.60	3.50

■Derating Curve



■Soldering Condition (Ref. IPC/JEDEC J-STD-020 & J-STD-002)



Reflow Profiles	
Profile Feature	**Pb-Free Assembly**
Preheat Min. Temperature (Tsmin) Max Temperature (Tsmax) Preheating time (ts) from (Tsmin to Tsmax)	 150 °C 200 °C 60-120 seconds
Ramp-up rate (T_L to Tp)	3 °C/second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	217 °C 60-150 seconds
Min. Peak temperature (Tp min)	235°C
Max. Peak temperature (Tp max)	260°C
Time (tp) within 5 °C of the specified classification temperature (Tc)	30 seconds max.
Ramp-down rate (Tp to T_L)	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

■Standard Electrical Specifications

Item / Type	Power Rating at 70ºC	Operating Temp. Range	Max. Operating Current	Resistance Range (mΩ)		TCR (PPM/ºC)
				±1%	±5%	
RS-02 (0402)	1/16W	-55 ~ +155°C	1.11A	50 - 91 100 - 976		±800 ±500
RS-03 (0603)	1/10W	-55 ~ +155°C	2.23A	20 - 47 50 - 91 100 - 976		±1200 ±800 ±500
RS-05 (0805)	1/8W	-55 ~ +155°C	3.53A	10 - 18 20 - 47 50 - 91 100 - 976		±1500 ±1200 ±800 ±500
RS-06 (1206)	1/4W	-55 ~ +155°C	5.00A			
RS-10 (1210)	1/3W	-55 ~ +155°C	5.77A	10 - 18 20 - 91 100 - 976		±1500 ±800 ±500
RS-0A (2010)	3/4W	-55 ~ +155°C	8.66A			
RS-12 (2512)	1W	-55 ~ +155°C	10.0A			

Operating Voltage=√(P*R) ; Overload Voltage=2.5*√(P*R)

■High Power Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Current	Resistance Range (mΩ)		TCR (PPM/°C)
				±1%	±5%	
RS-02 (0402)	1/10W	-55 ~ +155°C	1.40A	50 - 91 100 - 976		±800 ±500
RS-03 (0603)	1/8W	-55 ~ +155°C	2.50A	20 - 47 50 - 91 100 - 976		±1200 ±800 ±500
RS-05 (0805)	1/4W	-55 ~ +155°C	5.00A	10 - 18 20 - 47 50 - 91 100 - 976		±1500 ±1200 ±800 ±500
RS-06 (1206)	1/2W	-55 ~ +155°C	7.07A			
RS-10 (1210)	1/2W	-55 ~ +155°C	7.07A	10 - 18 20 - 91 100 - 976		±1500 ±800 ±500
RS-0A (2010)	1W	-55 ~ +155°C	10.0A			
RS-12 (2512)	2W	-55 ~ +155°C	14.1A			

Operating Voltage=√(P*R)
Overload Voltage=2.5*√(P*R)
Operating Current=√(P/R)
■ Viking is capable of manufacturing the optional spec based on customer's requirement.

■Environmental Characteristics

Item	Requirement		Test Method
	±1%	±5%	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		**JIS-C-5201-1 4.8** **IEC-60115-1 4.8** At 25°C/-55°C and 25°C/+125°C, 25°C is the reference temperature
Short Time Overload	±(1.0%+0.05Ω)	±(2.0%+0.05Ω)	**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)	**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)	**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)	**JIS-C-5201-1 4.23** **IEC-60115-1 4.23.2** at +155°C for 1000 hrs
Bending Strength	±(1.0%+0.05Ω)	±(1.0%+0.05Ω)	**JIS-C-5201-1 4.33** **IEC-60115-1 4.33** Bending once for 60 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)	**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 RS-02:100V; RS-03:150V; RS-05:300V RS-06/10/0A:400V; RS-12:500V
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)	**JIS-C-5201-1 4.19** **IEC-60115-1 4.19** -55°C to +155°C, 5 cycles

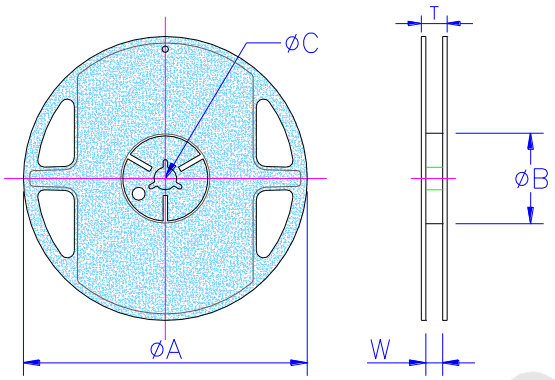
RCWV(Rated Continuous Working Voltage)=√(P*R) or Max. Operating Voltage whichever is lower.

■ **Storage Temperature: 15~28°C; Humidity < 80%RH**

■ **Shelf Life: 2 years from production date.**

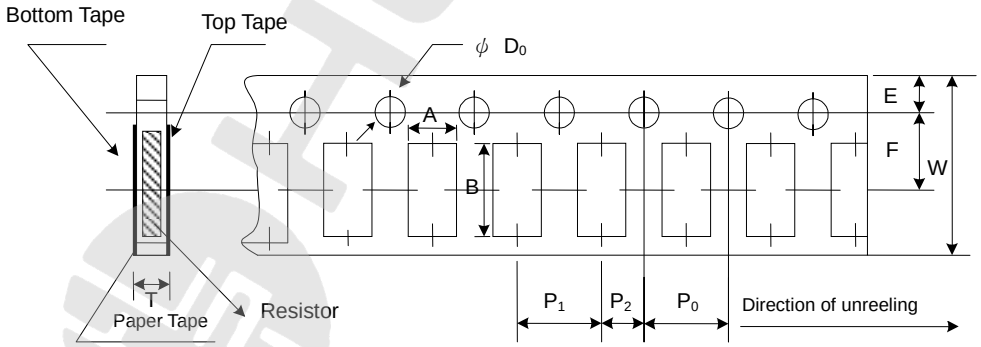
■Packaging

Reel Specifications & Packaging Quantity



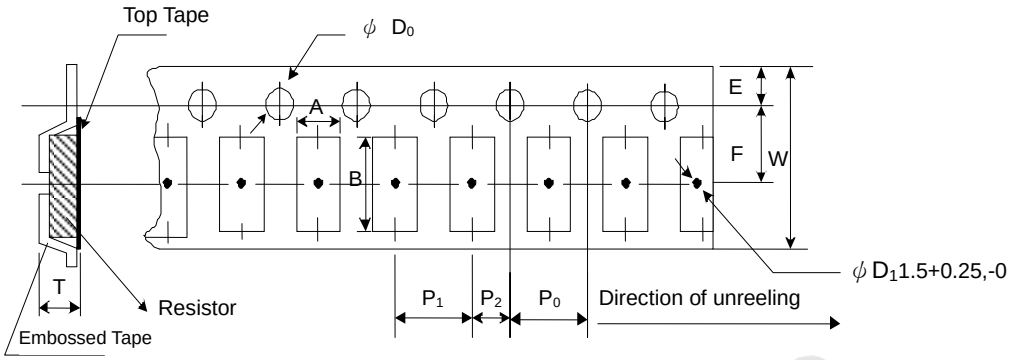
Type	Packaging Quantity		Tape Width	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)
RS-02	Paper	10K	8mm	7 inch	178.5±1.5	$60^{+1/-0}$	13.0±0.2	9.0±0.5	12.5±0.5
		20K	8mm	10 inch	254±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
		40K	8mm	13 inch	330±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
RS-03 RS-05 RS-06 RS-10	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
RS-0A RS-12	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

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)
RS-02	0.65±0.10	1.15±0.10	8.00±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
RS-03	1.10±0.10	1.90±0.10	8.00±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
RS-05	1.60±0.10	2.40±0.20	8.00±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
RS-06	1.90±0.10	3.50±0.20	8.00±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
RS-10	2.90±0.10	3.50±0.20	8.00±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)	ΦD_0 (mm)	T (mm)
RS-0A	2.80±0.10	5.40±0.20	12.0±0.30	1.75±0.10	5.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1, -0	1.2^{+0}
RS-12	3.50±0.10	6.70±0.10	12.0±0.30	1.75±0.10	5.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1, -0	1.2^{+0}

■Marking

No Marking for 0402

1%, 5% for 0805/1206/1210/2010/2512: 4 digits marking

Example:

Resistance	47mΩ	75mΩ	15mΩ	750mΩ	820mΩ
Marking	R047	R075	R015	R750	R820

5% for 0603: 3 digits marking in E24

1% for 0603: 3 digits marking with under-line in E96 (non-including E24 series)



3 digits marking for E24 or R value suffix is zero in E96: R10=100mΩ; R28=280mΩ



3 digits marking for E96: 243=243mΩ; 511=511mΩ

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version A9	Jun 03, 2014	-	- Environmental Characteristics updated
Version B	Jul 15, 2016	-	- Remove Material Description - Modify Storage Temperature
Version B1	Mar 06, 2017	-	- Size 1206 High power product Power rating 1/3W upgrade to 1/2W
Version B2	May 20, 2019	-	- Modify TCR Test description
Version B3	Mar 10, 2021	-	- Modify Bending Test description - Modify 2010 Embossed Plastic Tape B Specification - Modify Soldering Condition (IPC/JEDEC J-STD-020)
Version B4	Nov 15, 2021	-	- Increase the shelf life description
Version B5	Feb 15, 2022	-	- Derating Curve changes the temperature range
Version B6	Jun 15, 2022	-	- Modify Soldering Condition
Version B7	Aug 26, 2025	-	- Modify the descriptions in the Features - Modify 0402 Dimensions