

# RVFM series Thick Film High Voltage Chip Resistor (AEC-Q200)

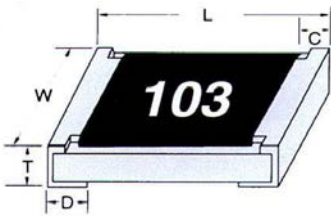
## ◆ Features

- » Special material and design for high working voltage require
- » Compatible with flow and reflow soldering
- » Suitable for lead free soldering
- » Max. Voltage Coefficient Resistance below 300ppm
- » Meet AEC-Q200

## ◆ Application

- » Power supply
- » Automotive industry
- » Measurement instrument
- » Medical equipment

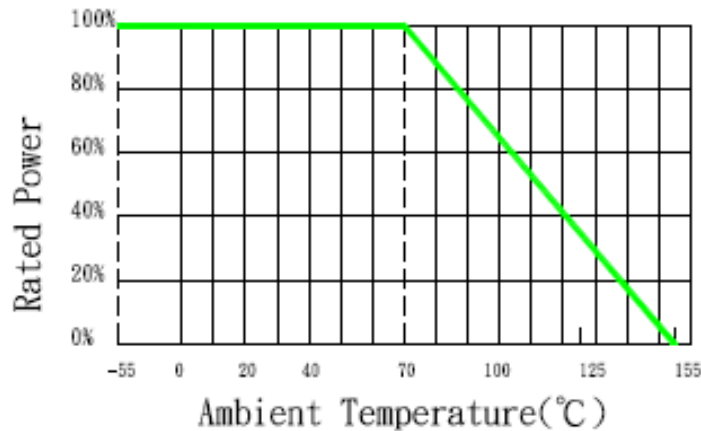
## ◆ Dimensions



Size	L	W	C	D	T
0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
1206	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.20	0.55±0.10
2010	5.00±0.20	2.50±0.20	0.65±0.25	0.60±0.25	0.60±0.10
2512	6.40±0.20	3.20±0.20	0.65±0.25	0.90±0.25	0.60±0.15

Unit: mm

## ◆ Power Derating Curve



## ◆ Rating

### HIGH VOLTAGE POWER CHIP RESISTOR

Type	Power Rating at 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient (ppm/°C)	Resistance Range	
						Min.	Max.
RVFM0603	1/10W	200V	400V	±1%(F) ±5%(J)	±100 ±200	100K 100K	10M 22M
RVFM0805	1/8W	400V	800V	±1%(F) ±5%(J)	±100 ±200	100K 100K	10M 22M
RVFM1206	1/4W	800V	1600V	±1%(F) ±1%(F) ±5%(J)	±100 ±200 ±200	100K 11M 100K	10M 22M 100M
RVFM2010	1/2W	2000V	3000V	±1%(F) ±1%(F) ±5%(J)	±100 ±200 ±200	100K 11MΩ 100K	10M 22M 100M
RVFM2512	1W	3000V	4000V	±1%(F) ±1%(F) ±5%(J)	±100 ±200 ±200	100K 11M 100K	10M 22M 100M

## ◆ Part Number

RVFM	1206	F	100K
Type	Size	Tolerance	R Value
RVFM	0603	F: ± 1%	100KΩ = 100K
	0805	J: ± 5%	10MΩ = 10M
	1206		
	2010		
	2512		

## ◆ Specification

### Specification and Test Method

TEST	SPECIFICATION	TEST METHOD
DC Resistance	F : $\pm 1\%$ ; J : $\pm 5\%$	AEC-Q200 TABLE 7.1 IEC 60115-1 / JIS C 5201-1 , Clause 4.5 Measure the resistance Value.
High Temperature Exposure (Storage)	J : $\Delta R \leq \pm(3\%+0.1\Omega)$ F : $\Delta R \leq \pm(1\%+0.05\Omega)$	AEC-Q200 TABLE 7.3 1000 hrs. @ T=125°C. Unpowered. Measurement at 24 $\pm$ 2 hours after test conclusion.
*Temperature Cycling	$\Delta R \leq \pm(1\% + 0.1\Omega)$ No mechanical damage	AEC-Q200 TABLE 7.4 1000 Cycles (-55°C to +125°C). Measurement at 24 $\pm$ 4 hours after test conclusion
Moisture Resistance	$\Delta R \leq \pm(1\%+0.1\Omega)$	AEC-Q200 TABLE 7.6 Test 65°C/80~100%RH/10Cycles. Measurement at 24 $\pm$ 2 hours after test conclusion. (t=24hrs/cycle).
Biased Humidity	J : $\Delta R \leq \pm(5\%+0.1\Omega)$ F : $\Delta R \leq \pm(3\%+0.05\Omega)$ VCR within the spec.	AEC-Q200 TABLE 7.7 1000 hours 85°C/85%RH. 10% of operating power. Measurement at 24 $\pm$ 2 hours after test conclusion
Operational Life	J : $\Delta R \leq \pm(5\%+0.1\Omega)$ F : $\Delta R \leq \pm(3\%+0.05\Omega)$ VCR within the spec.	AEC-Q200 TABLE 7.8 Test 1000hr @ TA=125°C at specified rated power. Measurement at 24 $\pm$ 2 hours after test conclusion.
External Visual	No visual damage and refer marking code.	AEC-Q200 TABLE 7.9 Inspect device construction, marking and workmanship.
Physical Dimension	Within the spec.	AEC-Q200 TABLE 7.10 Verify physical dimensions to the applicable device detail specification.
Mechanical Shock	Within product specification tolerance and no visible damage.	AEC-Q200 TABLE 7.13 Test Peak value:100g's,Wave:Hail-sine, Duration:6ms,Velocity:12.3ft/sec.
Vibration	No mechanical damage.	AEC-Q200 TABLE 7.14 5 g's for 20 min., 12 cycles each of 3 orientations. Test from 10-2000 Hz.

*Resistance to Solder Heat	$\Delta R \leq \pm(1\% + 0.1\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.15 Solder dipping @ 270°C ±5°C for 10sec. ±1sec
Thermal Shock	J : $\Delta R \leq \pm(1\% + 0.1\Omega)$ F : $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.16 -55 to 155°C / dwell time 15min/ Max transfer time 20sec/ 300cycles.
ESD	$\Delta R \leq \pm(1\% + 0.1\Omega)$ No mechanical damage.	AEC-Q200-002 Test contact min. 1KV.
*Solder Ability	Over 95% of termination must be covered with solder.	AEC-Q200 TABLE 7.18 a) Baking 155°C 4H, dipping 235°C 5s b) Steam 1H, dipping 215°C 5s c) Steam 1H, dipping 260°C 7s
Flammability	Refer UL-94.	AEC-Q200 TABLE 7.20 UL-94 V-0 or V-1 are acceptable
*Board Flex	J : $\Delta R \leq \pm(1\% + 0.1\Omega)$ F : $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.21 Bending 2mm 2512.2010.1210.1206, 3mm 0805.0603
Terminal Strength	No mechanical damage	AEC-Q200 TABLE 7.22 Force 1 Kg for 60 seconds.
*Short Time Overload	J : $\Delta R \leq \pm(2\% + 0.1\Omega)$ F : $\Delta R \leq \pm(1\% + 0.1\Omega)$	IEC 60115-1, Clause 4.13 5 × Rated power for 5 seconds
*Load Humidity Life	J : $\Delta R \leq \pm(3\% + 0.1\Omega)$ F : $\Delta R \leq \pm(1\% + 0.1\Omega)$	IEC 60115-1, Clause 4.24 40±2°C with relative humidity 90% ~ 95% D.C. rated voltage for 1.5 hours ON 30 minutes OFF. Cycle repeated 1000 hours.
*Temperature Coefficient of Resistance (TCR)	Within the spec.	IEC 60115-1, Clause 4.8 T1 T2 Test temperature : 25°C ~ -55°C 25°C ~ +155°C $TCR(\text{ppm}/^\circ\text{C}) = \frac{R2 - R1}{R1} \times \frac{1}{T2 - T1} \times 10^6$

*Load Life	J : $\Delta R \leq \pm(3\%+0.1\Omega)$ F : $\Delta R \leq \pm(1\%+0.1\Omega)$	IEC 60115-1, Clause 4.25 Rated voltage for 1.5 hours for followed by a pause 0.5 hour at $70\pm 2^{\circ}\text{C}$ . Cycle repeated 1000 hours.
*Insulation Resistance	Between termination and coating must over $1000\text{M}\Omega$	IEC 60115-1, Clause 4.6 Test voltage : $100\pm 15\text{V}$
*Voltage Coefficient Of Resistance (VCR)	$\leq 1\text{M}\Omega$ : $\pm 100\text{ppm}$ $> 1\text{M}\Omega$ : $\pm 200\text{ppm}$ $\geq 10\text{M}\Omega$ : $\pm 300\text{ppm}$	IEC 60115-1, Clause 4.11 Max. test voltage : 500V VL : 10% RCWV or Max.RCWV VH : 100% RCWV or Max.RCWV