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Internal

High Voltage Thick Film Chip Resistor

Features

- Highly reliable multilayer electrode construction
- Higher component and equipment reliability
- Excellent performance at high voltage
- Reduced size of final equipment
- Low VCR
- Manufactured in accordance with AEC-Q200 compliance

RS PRO High Voltage Low VCR Thick Film Chip Resistor RSPHVRC Series



RS PRO is the own brand of RS. The RS PRO Seal of Approval is your assurance of professional quality, a guarantee that every part is rigorously tested, inspected, and audited against demanding standards. Making RS PRO the Smart Choice for our customers.

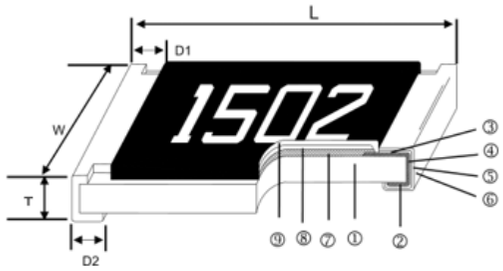
High Voltage Thick Film Chip Resistor

Product Description

Applications Include:

- Inverter - Outdoor Equipment
- Converter – High Pulse Equipment, Automotive Industry

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

Dimensions

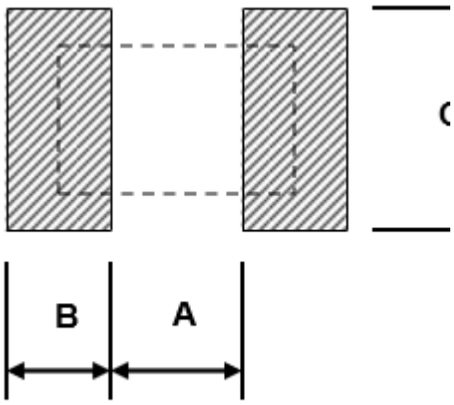
Type	Size (Inch)	L (mm)	W (mm)	T (mm)	D1 (mm)	D2 (mm)	Weight (g) (1000pcs)
RSPHVRC06	1206	3.10±0.10	1.55±0.10	0.55±0.10	0.50±0.25	0.50±0.20	8.9
RSPHVRC0A	2010	5.00±0.10	2.50±0.15	0.55±0.10	0.60±0.25	0.50±0.20	24.7
RSPHVRC12	2512	6.35±0.10	3.10±0.15	0.55±0.10	0.60±0.25	0.50±0.20	39.8

Part Number Make Up

Product Type	Dimensions	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance
RSPHVRC	06: 1206 0A: 2010 12: 2512	F: ±1%	T: 7” Taping Reel	E: ±100	O: 1/3W U: 1/2W T: 1W	1004: 1MΩ 1005: 10MΩ 1006: 100MΩ

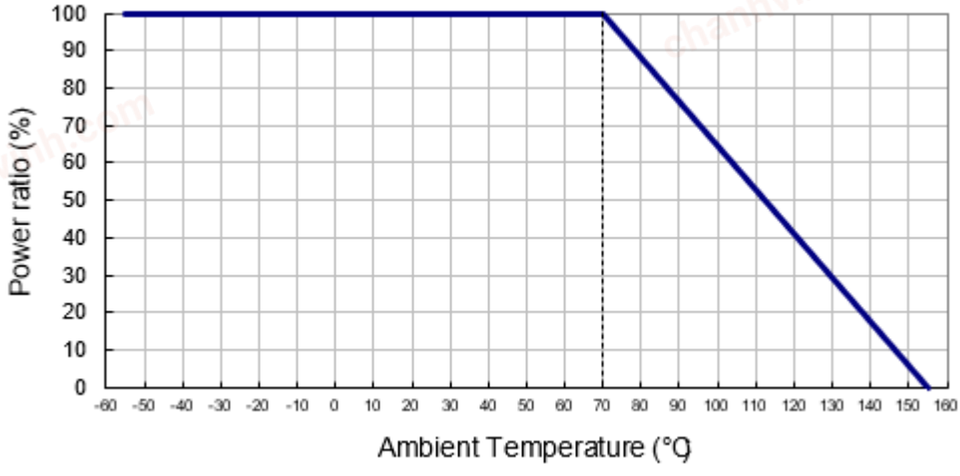
High Voltage Thick Film Chip Resistor

Recommended Land Pattern



Type	A (mm)	B (mm)	C (mm)
RSPHVRC06	2.00	0.90	1.60
RSPHVRC0A	3.80	0.90	2.80
RSPHVRC12	4.90	1.60	3.50

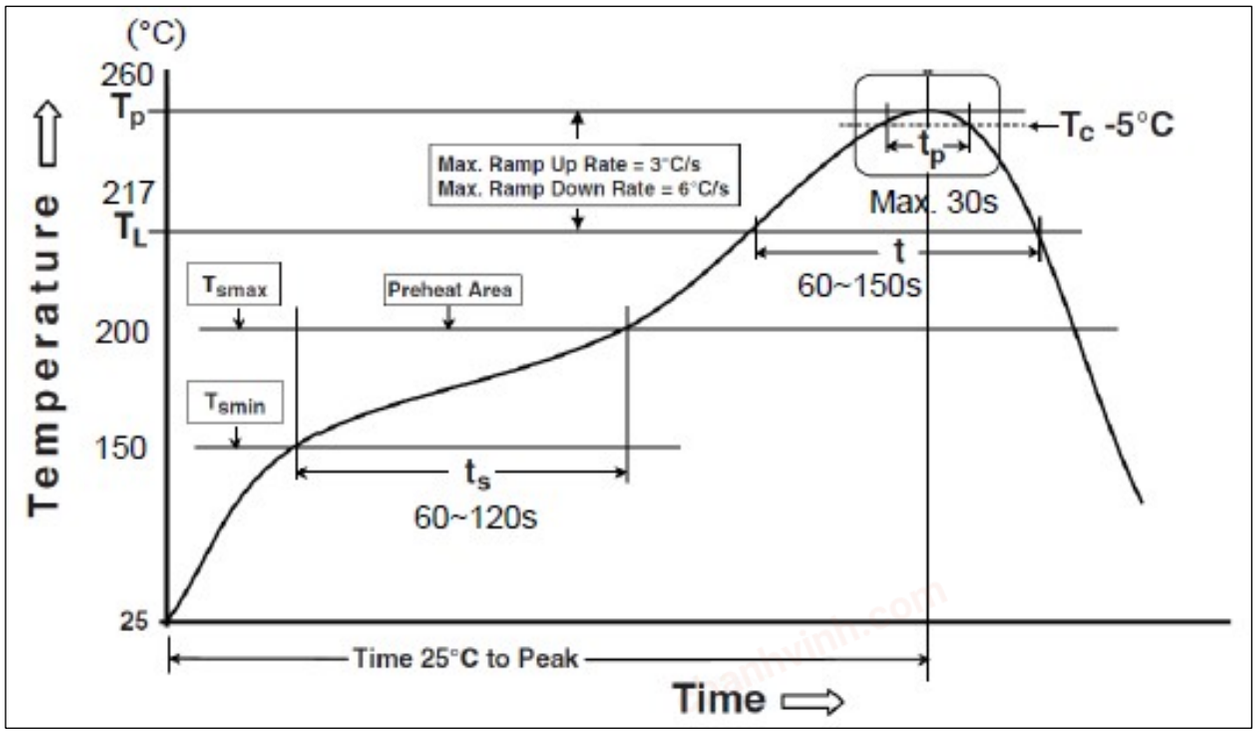
Derating Curve



High Voltage Thick Film Chip Resistor

Soldering Conditions

(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.

High Voltage Thick Film Chip Resistor

Electrical Specifications

Type	Power Rating	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range			TCR (PPM/°C)	VCR (PPM/V)
					±0.5% (E24 , E96)	±1% (E24 , E96))	±5% (E24)		
RSPHVRC06 (1206)	1/3W	+55 ~ +155°C	1000V	1500V	100KΩ – 1MΩ	100KΩ – 10MΩ	100KΩ – 500MΩ	±100	<25
RSPHVRC0A (2010)	1/2W		2000V	3000V	51KΩ – 1MΩ	51KΩ – 20MΩ	51KΩ – 500MΩ	±100	
RSPHVRC12 (2512)	1W		3000V	4000V	30KΩ – 1MΩ	30KΩ – 20MΩ	30KΩ – 500MΩ	±100	

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.

Environmental Characteristics

Item	Requirement		Test Method
	□1% and Below	□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
Voltage Coefficient (VCR)	As Spec.		IEC-60115-1 4.11 measured at 10 % and at 100 % of either the rated voltage or the limiting element voltage, whichever is the smaller
Short Time Overload	□(1.0%+0.05Ω)	□(1.0%+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
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”
Biased Humidity	□(1.0%+0.10Ω)	□(3.0%+0.10Ω)	MIL-STD-202 Method 103 1000 hrs 85□C/85%RH 10% of operating power
High Temperature Exposure	□(1.0%+0.05Ω)	□(1.0%+0.05Ω)	MIL-STD-202 Method 108 at +155□C for 1000 hrs
Board Flex	□(1.0%+0.05Ω)	□(1.0%+0.05Ω)	AEC-Q200-005 Bending once for 60 seconds 1206 size: 3mm 2010, 2512 sizes: 2mm

High Voltage Thick Film Chip Resistor

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
Item	Requirement		Test Method
	□1% and Below	□5%	
Voltage Proof	No breakdown or flashover		JIS-C-5201-1 4.7 IEC-60115-1 4.7 HVRC06/HVRC0A/HVRC12: 500V 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
Temperature Cycling	□(1.0%+0.05Ω)		JESD22 Method JA-104 -55□C to +125□C, 1000 cycles
Mechanical Shock	□(1.0%+0.05Ω)		MIL-STD-202 Method 213 Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.
Vibration	□(1.0%+0.05Ω)		MIL-STD-202 Method 204 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	□(3%+0.05Ω)		AEC-Q200-002 Human body model 2KV
Resistance to Solvents	No visible damage on appearance and marking.		MIL-STD-202 Method 215 Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Terminal Strength	No broken		AEC-Q200-006 Force of 1.8kg for 60 seconds.
Flammability	No ignition of the tissue paper or scorching or the pinewood board		UL-94 V-0 or V-1 are acceptable. Electrical test not required.

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

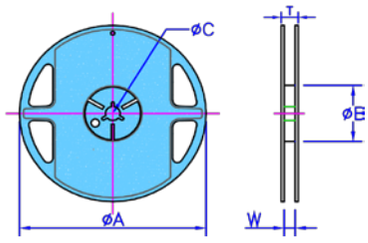
Storage Temperature: 15~28°C; Humidity < 80%RH

Shelf Life: 2 years from production date.

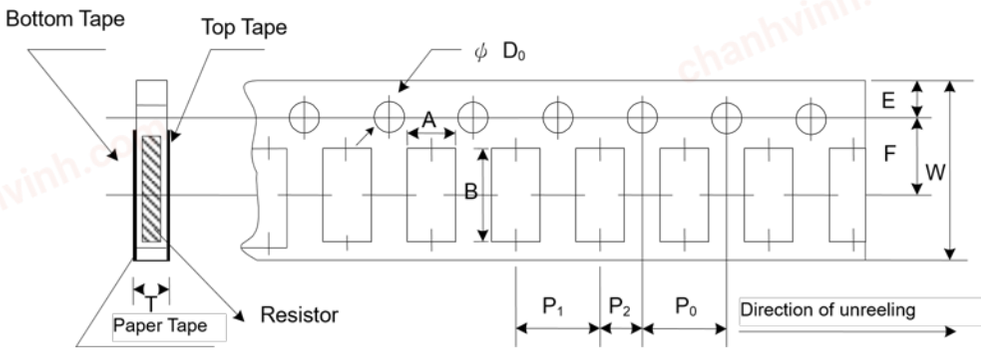
High Voltage Thick Film Chip Resistor

Packaging

Reel Specifications



Type	Packaging Quantity		Tape Width	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)
RSPHVRC06	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
RSPHVRC0A RSPHVRC12	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



Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P0 (mm)	P1 (mm)	P2 (mm)	ΦD0 (mm)	T (mm)
HVRC06	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

High Voltage Thick Film Chip Resistor

Marking

1% for 1206/2010/2512: 4 digits marking

Example:

Resistance	1MΩ	4.99MΩ	10MΩ
Marking	1004	4994	1005

5% for 1206/2010/2512: 3 digits marking in E24

Example: 124=120KΩ 106=10MΩ (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

Similar Products

MPN	RS PRO Article		
	SSM	P Part	MPQ
RSPHVRC06FTEO1003	2567845	2567845P	2567844
RSPHVRC06FTEO1004	2567848	2567847P	2567846
RSPHVRC06FTEO1005	2567849	2567849P	2567848
RSPHVRC06FTEO1203	2572947	2572947P	2572946
RSPHVRC06FTEO1204	2572949	2572949P	2572948
RSPHVRC06FTEO1503	2572952	2572952P	2572950
RSPHVRC06FTEO1504	2572954	2572954P	2572953
RSPHVRC06FTEO1803	2572956	2572956P	2572955
RSPHVRC06FTEO2203	2572960	2572960P	2572959
RSPHVRC06FTEO2204	2572962	2572962P	2572961
RSPHVRC06FTEO2703	2572964	2572964P	2572963
RSPHVRC06FTEO2704	2572966	2572966P	2572965
RSPHVRC06FTEO3303	2572969	2572969P	2572968
RSPHVRC06FTEO3304	2572971	2572971P	2572970
RSPHVRC06FTEO3903	2572974	2572974P	2572972
RSPHVRC06FTEO3904	2572976	2572976P	2572975
RSPHVRC06FTEO4703	2572978	2572978P	2572977
RSPHVRC06FTEO4704	2572980	2572980P	2572979
RSPHVRC06FTEO5603	2572982	2572982P	2572981
RSPHVRC06FTEO5604	2572984	2572984P	2572983
RSPHVRC06FTEO6803	2572986	2572986P	2572985
RSPHVRC06FTEO6804	2572988	2572988P	2572987
RSPHVRC06FTEO8203	2572991	2572991P	2572990
RSPHVRC06FTEO8204	2572993	2572993P	2572992

High Voltage Thick Film Chip Resistor

RSPHVRC0AFTEU1003	2572996	2572996P	2572994
RSPHVRC0AFTEU1004	2572998	2572998P	2572997
RSPHVRC0AFTEU1005	2573000	2573000P	2572999
RSPHVRC0AFTEU1203	2573002	2573002P	2573001
RSPHVRC0AFTEU1204	2573004	2573004P	2573003
RSPHVRC0AFTEU1205	2573007	2573007P	2573006
RSPHVRC0AFTEU1503	2573009	2573009P	2573008
RSPHVRC0AFTEU1504	2573012	2573012P	2573010
RSPHVRC0AFTEU1505	2573014	2573014P	2573013
RSPHVRC0AFTEU1803	2573016	2573016P	2573015
RSPHVRC0AFTEU1804	2573018	2573018P	2573017
RSPHVRC0AFTEU1805	2573020	2573020P	2573019
RSPHVRC0AFTEU2203	2573022	2573022P	2573021
RSPHVRC0AFTEU2204	2573024	2573024P	2573023
RSPHVRC0AFTEU2703	2573026	2573026P	2573025
RSPHVRC0AFTEU2704	2573029	2573029P	2573028
RSPHVRC0AFTEU3303	2573031	2573031P	2573030
RSPHVRC0AFTEU3304	2573033	2573033P	2573032
RSPHVRC0AFTEU3903	2573035	2573035P	2573034
RSPHVRC0AFTEU3904	2573037	2573037P	2573036
RSPHVRC0AFTEU4703	2573039	2573039P	2573038
RSPHVRC0AFTEU4704	2573041	2573041P	2573040
RSPHVRC0AFTEU5602	2573043	2573043P	2573042
RSPHVRC0AFTEU5603	2573045	2573045P	2573044
RSPHVRC0AFTEU5604	2573047	2573047P	2573046
RSPHVRC0AFTEU6802	2573049	2573049P	2573048
RSPHVRC0AFTEU6803	2573051	2573051P	2573050
RSPHVRC0AFTEU6804	2573053	2573053P	2573052
RSPHVRC0AFTEU8202	2573055	2573055P	2573054
RSPHVRC0AFTEU8203	2573057	2573057P	2573056
RSPHVRC0AFTEU8204	2573059	2573059P	2573058
RSPHVRC12FTET1003	2573061	2573061P	2573060
RSPHVRC12FTET1004	2573063	2573063P	2573062
RSPHVRC12FTET1005	2573065	2573065P	2573064
RSPHVRC12FTET1203	2573067	2573067P	2573066
RSPHVRC12FTET1204	2573069	2573069P	2573068
RSPHVRC12FTET1205	2573071	2573071P	2573070
RSPHVRC12FTET1503	2573073	2573073P	2573072
RSPHVRC12FTET1504	2573075	2573075P	2573074
RSPHVRC12FTET1505	2573077	2573077P	2573076
RSPHVRC12FTET1803	2573079	2573079P	2573078
RSPHVRC12FTET1804	2573081	2573081P	2573080
RSPHVRC12FTET1805	2573083	2573083P	2573082
RSPHVRC12FTET2203	2573085	2573085P	2573084
RSPHVRC12FTET2204	2573087	2573087P	2573086
RSPHVRC12FTET2703	2573089	2573089P	2573088

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Internal

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RSPHVRC12FTET2704	2573091	2573091P	2573090
RSPHVRC12FTET3303	2573093	2573093P	2573092
RSPHVRC12FTET3304	2573095	2573095P	2573094
RSPHVRC12FTET3902	2573097	2573097P	2573096
RSPHVRC12FTET3903	2573099	2573099P	2573098
RSPHVRC12FTET3904	2573101	2573101P	2573100
RSPHVRC12FTET4702	2573103	2573103P	2573102
RSPHVRC12FTET4703	2573105	2573105P	2573104
RSPHVRC12FTET4704	2573108	2573108P	2573107
RSPHVRC12FTET5602	2573110	2573110P	2573109
RSPHVRC12FTET5603	2573112	2573112P	2573111
RSPHVRC12FTET5604	2573114	2573114P	2573113
RSPHVRC12FTET6802	2573116	2573116P	2573115
RSPHVRC12FTET6803	2573118	2573118P	2573117
RSPHVRC12FTET6804	2573120	2573120P	2573119
RSPHVRC12FTET8202	2573122	2573122P	2573121
RSPHVRC12FTET8203	2573124	2573124P	2573123
RSPHVRC12FTET8204	2573126	2573126P	2573125

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