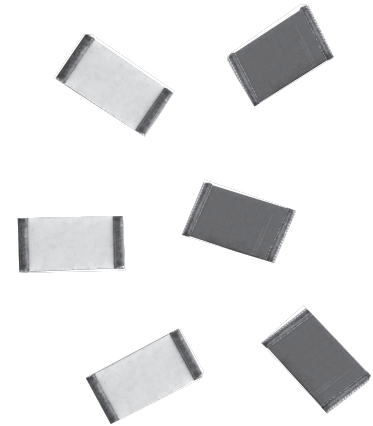


High Voltage Chip Resistors

HVC Series

- Continuous voltages up to 3kV
- Overload voltages up to 4kV
- Values up to 1GΩ
- Precision to $\pm 0.5\%$ & $\pm 50\text{ppm}/^\circ\text{C}$
- 100% screened by automated optical inspection
- 100% screened by high voltage overload
- Anti-sulphur version available
- AEC-Q200 grade available



All Pb-free parts comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

Electrical Data

		1206	2010	2512	Notes
Power rating @70°C	watts	0.3	0.5	1	
Limiting element voltage	volts	1000	2000	3000	DC or AC peak
Maximum overload voltage (2s) ¹	volts	1500	3000	4000	
Resistance range	ohms	10K to 1GΩ			Consult factory for out of range values
Resistance tolerance	%	0.5, 1, 2, 5, 10			See table of value ranges
TCR	ppm/°C	50, 100, 500			
Ambient temperature range	°C	-55 to +155			
Values		E24 & E96 preferred			Any value to order
Thermal Impedance	°C/W	200	80	70	

Note 1: 100% high voltage screened in ohmic range 300K to 40M

Value Ranges (ohms)

Size	TCR (ppm/°C)	Tolerance (%)		
		0.5	1 & 2	5 & 10
1206	50	-	10K to 10M	10K to 100M
	100	10K to 2M		
	500	-		>100M
2010 & 2512	50	-	10K to 100M	10K to 100M
	100	10K to 10M		
	500	-		>100M

Physical Data

Dimensions (mm) & Weight (mg)							
	L	W	T max	A	B min	C	Wt.
1206	3.2±0.2	1.6±0.2	0.7	0.35±0.2	1.95	0.35±0.2	8.5
2010	5.1±0.3	2.5±0.2	0.8	0.45±0.2	3.7	0.4±0.25	36
2512	6.5±0.3	3.2±0.2	0.8	0.45±0.2	5	0.4±0.2	55

Wrap-around terminations (3 faces)

General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

HVC Series

Construction

Resistive thick film material, overglaze and organic protection are screen printed on a 96% alumina substrate. The design and laser adjustment of the resistive element optimises the limiting element voltage of the resistor.

Terminations

The chips are supplied with wrap-around terminations suitable for soldering. Consult factory for alternative termination options.

Solderability

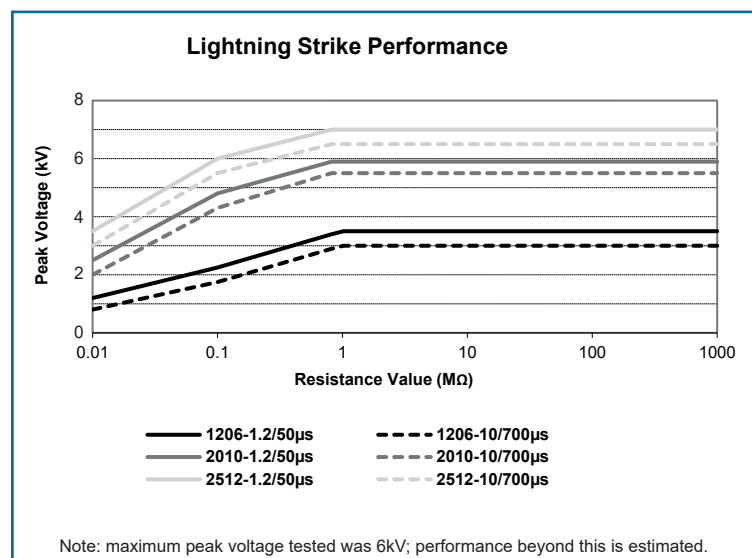
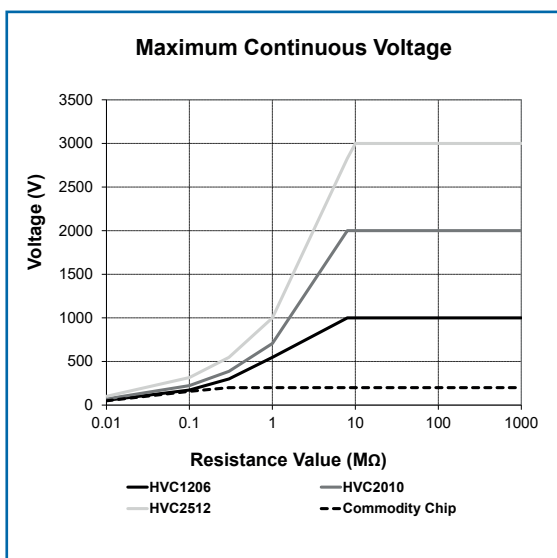
The terminations have an electroplated nickel barrier and tin finish. This ensures excellent 'leach' resistance properties and solderability.

Marking

The body protection is resistant to all normal cleaning solvents suitable for printed circuits. The chips are not marked and the relevant information on type, value, tolerance date code and quantity are recorded on the reel.

Performance Data

			Maximum	Typical
Load at rated power: 1000 hours at 70°C	$\Delta R\%$		1206: 2 2010/2512: 1	1206: 1 2010/2512: 0.25
Shelf life test: 12 months at room temperature	$\Delta R\%$		0.1	0.02
Derating from rated power at 70°C			Zero at 155°C	
Short term overload: Lesser of 6.25 x rated power or Maximum overload voltage	$\Delta R\%$		2	0.2
Lightning strike: 1.2/50 μ s & 10/700 μ s - see graph for peak voltage	$\Delta R\%$		0.5	0.2
Dry heat: 1000 hours at 155°C	$\Delta R\%$		0.5	0.1
Long term damp heat	$\Delta R\%$		1	0.25
Temperature rapid change	$\Delta R\%$		0.25	0.05
Resistance to solder heat	$\Delta R\%$		0.25	0.05
Anti-sulphur grade (AS)	ASTM-B-809 (1000 hours, 50°C, 91-93% RH)	$\Delta R\%$	0.25	0.05
	EIA-977 (750 hours, 105°C)	$\Delta R\%$	0.25	0.05
Sulphur-resistant grade (SR)	ASTM-B-809 (1000 hours, 50°C, 91-93% RH)	$\Delta R\%$	0.25	0.05
	Modified ASTM-B-809 (1000 hours, 105°C, 85% RH)	$\Delta R\%$	1	0.25
Voltage proof	volts		500	
Voltage coefficient of resistance			1206: -25 2010: -15	1206: -15 2010: -5
			2512 \leq100M: -5 2512 >100M: -15	2512 \leq100M: -1.5 2512 >100M: -8
		ppm/V		



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HVC Series

Application Notes

HVC resistors are ideally suited for handling by automatic methods due to their rectangular shape and the small dimensional tolerances. Electrical connection to a ceramic substrate or to a printed circuit board can be made by reflow or wave soldering of wrap-around terminations.

Wrap-around terminations provide good leach properties and ensure reliable contact. Due to the robust construction, the HVC can be immersed in the solder bath for 30 seconds at 260°C. This enables the resistor to be mounted on one side of a printed circuit board and wire-leaded components applied on the other side.

HVC resistors themselves can operate at a maximum

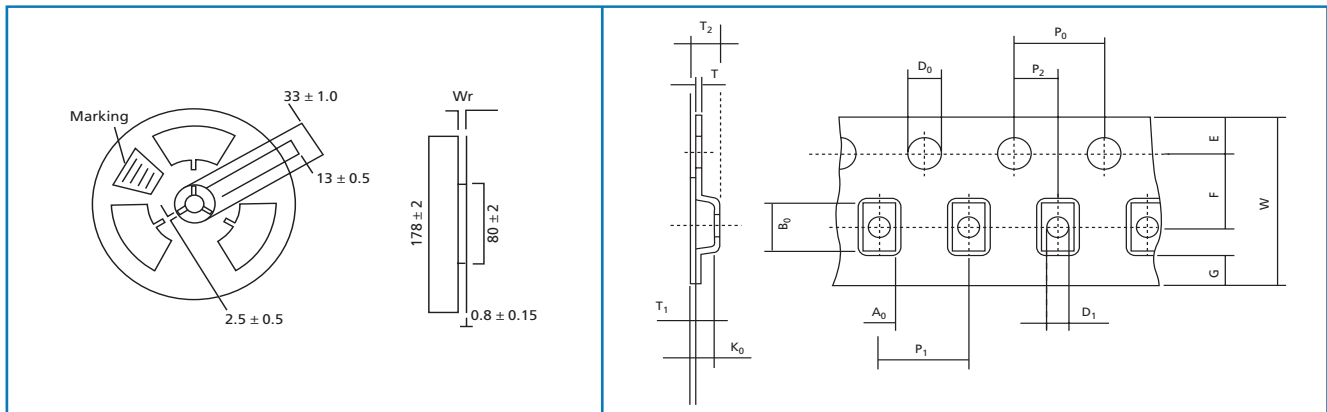
temperature of 155°C (see performance above). For soldered resistors, the joint temperature should not exceed 110°C. This condition is met when the stated power levels at 70°C are used.

The PCB layout should avoid tracks running between the HVC mounting pads, as this would compromise the LEV.

The LEV stated applies to operation at sea-level pressure, in a non-condensing atmosphere and non-contaminating environment. Voltage derating should be applied if low pressure, high humidity or contamination may be encountered. The termination clearance dimension (B) should be used in conjunction with the creepage limit applicable to the circuit application in order to determine the derated LEV.

Packaging

HVC Resistors are supplied taped and reeled as per IEC 286-3.



Tape and reel dimensions (mm)

	Wr	W	P1	P0	P2	D0	D1	E	F	A0	B0	K0	T	T1	T2	Qty. per reel
	±0.5	±0.3	±0.1	±0.1	±0.05	±0.1	±0.2	±0.1	±0.05	±0.1	±0.1	±0.1	±0.05	Nom.	±0.15	
1206	9	8	4	4	2	1.5	1	1.75	3.5	1.95	3.55	1.0	0.2	0.05	1.3	3000
2010	13	12	4	4	2	1.5	1.5	1.75	5.5	2.79	5.89	0.91	0.28	0.06	1.21	3000
2512	13	12	8	4	2	1.5	1.5	1.75	5.5	3.61	6.96	1.17	0.28	0.06	1.45	1800

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HVC Series

Ordering Procedure

Example: HVC2512-4M7FT18 (2512, 4.7 megohms $\pm 1\%$, with $\pm 100\text{ppm}/^\circ\text{C}$ TCR and standard grade and terminations, Pb-free)



1	2	3	4	5	6	7		
Type	Size	TCR	Sulphur Grade ²	Value	Tolerance	Grade, Termination & Packing		
HVC	1206	Omit for	Omit for standard	E24 = 3/4 characters	D = $\pm 0.5\%$	Standard grade, Pb-free finish		
	2010	$\pm 100/500\text{ppm}/^\circ\text{C}$	AS = Anti-sulphur	E96 = 3/4 characters	F = $\pm 1\%$	T3	1206, 2010	3000/reel
	2512	C = $\pm 50\text{ppm}/^\circ\text{C}$	SR = Sulphur Resistant	K = kilohms	G = $\pm 2\%$	T18	2512	1800/reel
				M = megohms	J = $\pm 5\%$	Standard grade, SnPb finish		
				G = gigohms	K = $\pm 10\%$	PB	Quantities as for Pb-free	
						AEC-Q200 grade, Pb-free finish		
						A3	1206, 2010	3000/reel
						A18	2512	1800/reel
						AEC-Q200 grade, SnPb finish		
						PBA	Quantities as for Pb-free	

Note 1: The hyphen is omitted if necessary to keep the total character count below 19.

Note 2: For new designs requiring resistance to sulphur-bearing gas, SR grade is preferred.

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