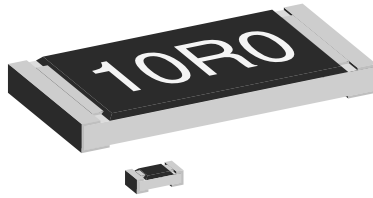


## Thick Film, Rectangular Chip Resistors for Conductive Gluing



### FEATURES

- AgPd-Terminations for conductive gluing
- Stability  $\Delta R/R = 1\%$  for 1000 h at 70 °C
- Metal glaze on high quality ceramic
- Compliant to RoHS directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

STANDARD ELECTRICAL SPECIFICATIONS								
MODEL	SIZE		RATED DISSIPATION $P_{70}$ W	LIMITING ELEMENT VOLTAGE $U_{max. AC/DC}$	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE $\Omega$	SERIES
	INCH	METRIC						
D10 AP	0402	RR 1005M	0.063	50	$\pm 100$ $\pm 200$	$\pm 1$ $\pm 5$	100R to 10M 10R to 10M	E24; E96 E24
			Zero-Ohm-Resistor: $R_{max.} < 200 \text{ m}\Omega$ , $I_{max.} = 0.5 \text{ A}$					
D11 AP	0603	RR 1608M	0.10	75	$\pm 100$ $\pm 200$	$\pm 1$ $\pm 5$	18R to 10M 3R6 to 10M	E24; E96 E24
			Zero-Ohm-Resistor: $R_{max.} < 200 \text{ m}\Omega$ , $I_{max.} = 0.7 \text{ A}$					
D12 AP	0805	RR 2012M	0.125	150	$\pm 100$ $\pm 200$	$\pm 1$ $\pm 5$	18R to 10M 3R6 to 10M	E24; E96 E24
			Zero-Ohm-Resistor: $R_{max.} < 200 \text{ m}\Omega$ , $I_{max.} = 0.8 \text{ A}$					
D25 AP	1206	RR 3216M	0.25	200	$\pm 100$ $\pm 200$	$\pm 1$ $\pm 5$	18R to 10M 3R6 to 10M	E24; E96 E24
			Zero-Ohm-Resistor: $R_{max.} < 200 \text{ m}\Omega$ , $I_{max.} = 1.0 \text{ A}$					
CRCW1210-AP	1210	RR 3225M	0.50	200	$\pm 100$ $\pm 200$	$\pm 1$ $\pm 5$	18R to 10M 3R6 to 10M	E24; E96 E24
			Zero-Ohm-Resistor: $R_{max.} < 200 \text{ m}\Omega$ , $I_{max.} = 1.5 \text{ A}$					
CRCW1218-AP	1218	RR 3246M	1.0	200	$\pm 100$ $\pm 200$	$\pm 1$ $\pm 5$	18R to 2M2 3R6 to 2M2	E24; E96 E24
			Zero-Ohm-Resistor: $R_{max.} < 200 \text{ m}\Omega$ , $I_{max.} = 2.0 \text{ A}$					
CRCW2010-AP	2010	RR 5025M	0.75	400	$\pm 100$ $\pm 200$	$\pm 1$ $\pm 5$	18R to 10M 3R6 to 10M	E24; E96 E24
			Zero-Ohm-Resistor: $R_{max.} < 200 \text{ m}\Omega$ , $I_{max.} = 1.8 \text{ A}$					
CRCW2512-AP	2512	RR 6332M	1.0	500	$\pm 100$ $\pm 200$	$\pm 1$ $\pm 5$	18R to 10M 3R6 to 10M	E24; E96 E24
			Zero-Ohm-Resistor: $R_{max.} < 200 \text{ m}\Omega$ , $I_{max.} = 2.0 \text{ A}$					

### Notes

- These resistors do not feature a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional time.
- Marking and packaging: See datasheet "Surface Mount Resistor Marking" (document number 20020)
- Power rating depends on the max. temperature at the joint point, the component placement density and the substrate material.

TECHNICAL SPECIFICATIONS									
PARAMETER	UNIT	D10 AP	D11 AP	D12 AP	D25 AP	CRCW1210-AP	CRCW1218-AP	CRCW2010-AP	CRCW2512-AP
Rated dissipation $P_{70}$ <sup>(1)</sup>	W	0.063	0.1	0.125	0.25	0.5	1.0	0.75	1.0
Limiting element voltage $U_{max. AC/DC}$	V	50	75	150	200	200	200	400	500
Insulation voltage $U_{ins. (1 \text{ min})}$	V	> 75	> 100	> 200	> 300	> 300	> 300	> 300	> 300
Insulation resistance	$\Omega$	> $10^9$							
Category temperature range	°C	- 55 to + 155							
Failure rate	$\text{h}^{-1}$	< $0.1 \times 10^{-9}$							
Weight	mg	0.65	2	5.5	10	16	29.5	25.5	40.5

### Note

- <sup>(1)</sup> The power dissipation on the resistors generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature of 155 °C is not exceeded.

## PART NUMBER AND PRODUCT DESCRIPTION (Equal to or smaller than 1206 case size)

Part Numbering: D1208058B5620FP5<sup>(1)</sup>

D 1 2 0 8 0 5 8 B 5 6 2 0 F P 5

MODEL/SIZE	SPECIAL CHARACTER	TCR	VALUE	TOLERANCE	PACKAGING	SPECIAL
D100402 D110603 D120805 D251206	8 = AgPd terminations for conductive gluing	B = ± 100 ppm/K A = ± 200 ppm/K 0 = Jumper	<b>3 digit value</b> <b>1 digit multiplier</b> MULTIPLIER 7 = *10 <sup>-3</sup> 8 = *10 <sup>-2</sup> 9 = *10 <sup>-1</sup> 0 = *10 <sup>0</sup> 1 = *10 <sup>1</sup> 2 = *10 <sup>2</sup> 3 = *10 <sup>3</sup> 4 = *10 <sup>4</sup> 5 = *10 <sup>5</sup> 6 = *10 <sup>6</sup> 0000 = Jumper	F = ± 1 % J = ± 5 % 0 = Jumper	P0 P5 PN PZ B5 BN	Up to 2 digits

Product Description: D12 AP 100 562R 1 % P5

D12 AP	100	562R	1 %	P5	BVxxxxx
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING	SPECIAL <sup>(2)</sup>
D10 AP D11 AP D12 AP D25 AP	± 100 ppm/K ± 200 ppm/K	49K9 = 49.9 Ω 5R1 = 5.1 kΩ 0R0 = Jumper	± 1 % ± 5 %	P0 P5 PN PZ B2 B4 B5 BN	Customized part number is available on request

## PART NUMBER AND PRODUCT DESCRIPTION (Equal to or larger than 1210 case size)

Part Numbering: CRCW2010562RFKB4AP<sup>(1)</sup>

C R C W 2 0 1 0 5 6 2 R F K B 4 A P

MODEL/SIZE	SPECIAL CHARACTER	TOLERANCE	TCR	PACKAGING	SPECIAL
CRCW1210 CRCW1218 CRCW2010 CRCW2512	R = Decimal K = Thousand M = Million 0000 = Jumper	F = ± 1.0 % J = ± 5.0 % Z = Jumper	K = ± 100 ppm/K N = ± 200 ppm/K 0 = Jumper	B2 B4	Up to 2 digits AP = Conductive gluing

Product Description: CRCW2010-AP 100 562R 1 % B4

CRCW2010-AP	200	562R	5 %	B4	BVxxxxx
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING	SPECIAL <sup>(2)</sup>
CRCW1210-AP CRCW1218-AP CRCW2010-AP CRCW2512-AP	± 100 ppm/K ± 200 ppm/K	10R = 10 Ω 562R = 562 Ω 10K = 10 kΩ 1M = 1 MΩ 0R0 = Jumper	± 1 % ± 5 %	B2 B4	Customized part number is available on request

### Notes

<sup>(1)</sup> Preferred way for ordering products is by use of the PART NUMBER.

<sup>(2)</sup> Detailed BV number will appear on the packaging label.

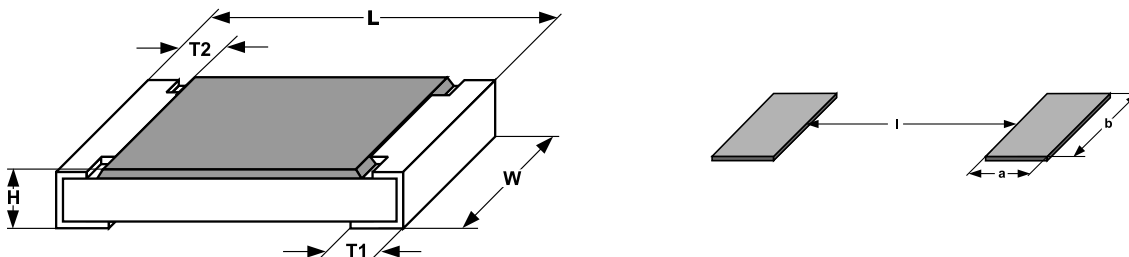


PACKAGING					
MODEL	UNIT	PAPER TAPE ACC. IEC 60286-3, TYPE I <sup>(4)</sup>		BLISTER TAPE ACC. IEC 60286-3, TYPE II	
		QUANTITY	CODE	QUANTITY	CODE
D10 AP	180 mm/7"	10 000	P0		
	330 mm/13"	50 000	PZ		
D11 AP	180 mm/7"	5000	P5	5000	B5
	285 mm/11.25"	10 000	P0		
	330 mm/13"	20 000	PN	20 000	BN
D12 AP	180 mm/7"	5000	P5	5000	B5
	285 mm/11.25"	10 000	P0		
	330 mm/13"	20 000	PN	20 000	BN
D25 AP	180 mm/7"	5000	P5	5000	B5
	285 mm/11.25"	10 000	P0		
	330 mm/13"	20 000	PN	15 000	BN
CRCW1210-AP	180 mm/7"	5000	P5		
	285 mm/11.25"	10 000	P0		
	330 mm/13"	20 000	PN		
CRCW1218-AP	180 mm/7"			4000	B4
CRCW2010-AP	180 mm/7"			4000	B4
CRCW2512-AP	180 mm/7"			2000	B2
				4000	B4

**Note**

<sup>(4)</sup> Flame treated paper for sizes D10 and D11. Regular paper for sizes D12 and D25.

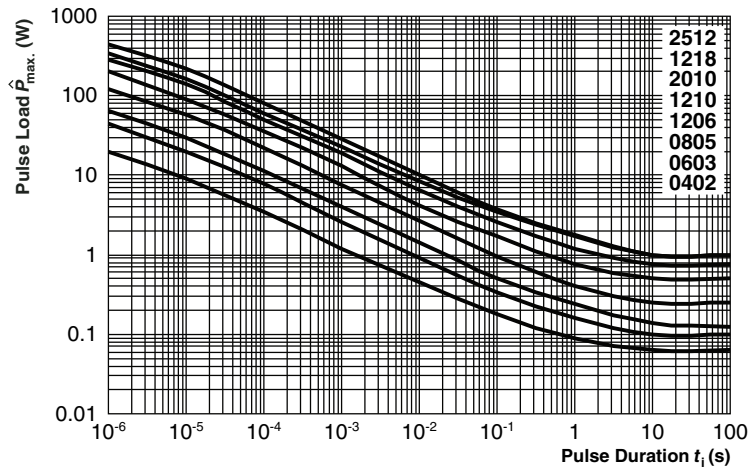
**DIMENSIONS**



SIZE		DIMENSIONS in millimeters					GLUING PADS DIMENSIONS in millimeters		
INCH	METRIC	L	W	H	T1	T2	a	b	l
0402	1005	1.0 ± 0.05	0.5 ± 0.05	0.35 ± 0.05	0.25 ± 0.05	0.2 <sup>+0.10</sup> / <sub>-0.15</sub>	0.4	0.6	0.5
0603	1608	1.55 <sup>+0.10</sup> / <sub>-0.05</sub>	0.85 ± 0.1	0.45 ± 0.05	0.3 ± 0.2	0.3 ± 0.2	0.9	0.9	1.0
0805	2012	2.0 <sup>+0.20</sup> / <sub>-0.10</sub>	1.25 ± 0.15	0.45 ± 0.05	0.3 <sup>+0.20</sup> / <sub>-0.10</sub>	0.3 ± 0.2	0.9	1.3	1.3
1206	3216	3.2 <sup>+0.10</sup> / <sub>-0.20</sub>	1.6 ± 0.15	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2	1.1	1.7	2.3
1210	3225	3.2 ± 0.2	2.5 ± 0.2	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2	0.9	2.5	2.0
1218	3246	3.2 <sup>+0.10</sup> / <sub>-0.20</sub>	4.6 ± 0.15	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2	1.05	4.9	1.9
2010	5025	5.0 ± 0.15	2.5 ± 0.15	0.6 ± 0.1	0.6 ± 0.2	0.6 ± 0.2	1.0	2.5	3.9
2512	6332	6.3 ± 0.2	3.15 ± 0.15	0.6 ± 0.1	0.6 ± 0.2	0.6 ± 0.2	1.0	3.2	5.2

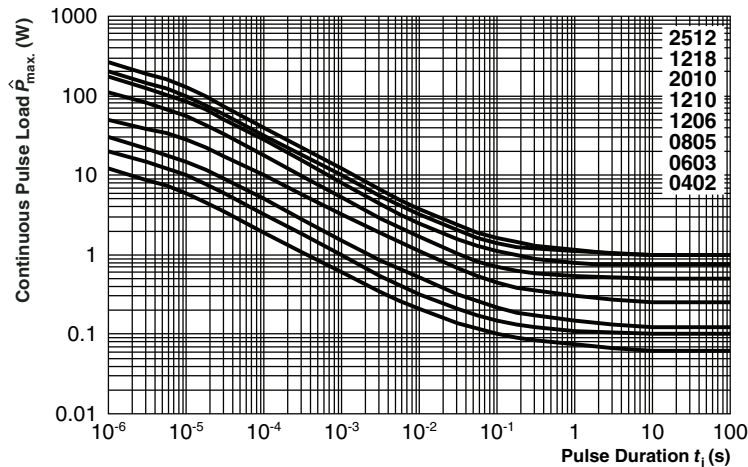
## FUNCTIONAL PERFORMANCE

### Single Pulse



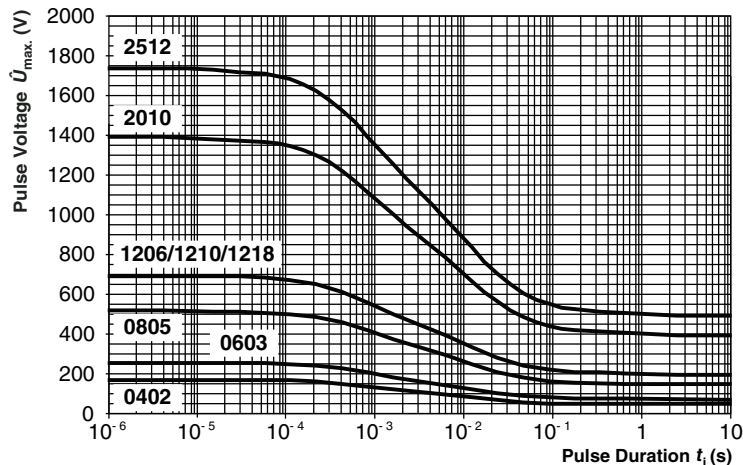
Maximum pulse load, single pulse; applicable if  $\bar{P} \rightarrow 0$  and  $n < 1000$  and  $\bar{U} \leq \bar{U}_{max}$ ; for permissible resistance change equivalent to 8000 h operation

### Continuous Pulse



Maximum pulse load, continuous pulses; applicable if  $\bar{P} \leq P(3_{amb})$  and  $\bar{U} \leq \bar{U}_{max}$ ; for permissible resistance change equivalent to 8000 h operation

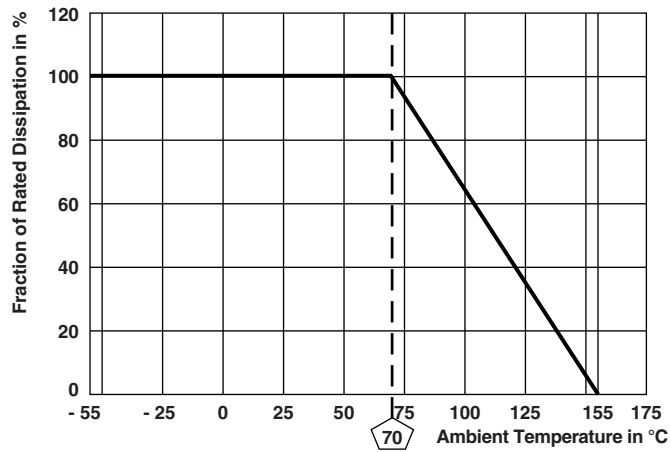
### Pulse Voltage



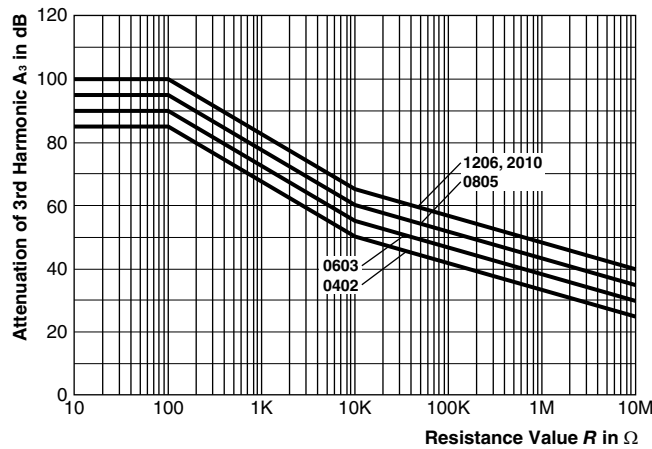
Maximum pulse voltage, single and continuous pulses; applicable if  $\bar{P} \leq \bar{P}_{max}$ ; for permissible resistance change equivalent to 8000 h operation



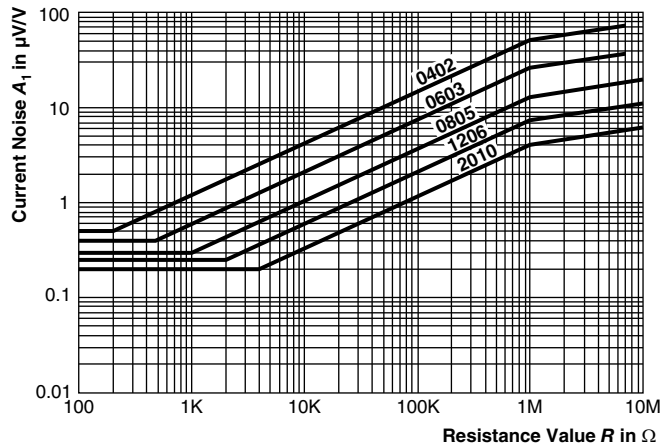
### Derating



### Non-Linearity



### Current Noise



TEST PROCEDURES AND REQUIREMENTS					
EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE ( $\Delta R$ )	
				STABILITY CLASS 2 OR BETTER	
			Stability for product types:		
			<b>D AP, CRCW-AP</b>	18 $\Omega$ to 10 M $\Omega$	3.6 $\Omega$ to 10 M $\Omega$
4.5	-	Resistance	-	$\pm 1\%$	$\pm 5\%$
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70}} \times R$ $\leq 2 \times U_{max.}$ ; duration: Acc. to style	$\pm (0.25\% R + 0.05 \Omega)$	
4.8.4.2	-	Temperature coefficient	(20/- 55/20) $^{\circ}\text{C}$ and (20/125/20) $^{\circ}\text{C}$	$\pm 100$ ppm/K	$\pm 200$ ppm/K
4.19	14 (Na)	Rapid change of temperature	30 min. at - 55 $^{\circ}\text{C}$ ; 30 min. at 125 $^{\circ}\text{C}$  5 cycles  1000 cycles	$\pm (0.25\% R + 0.05 \Omega)$  $\pm (1\% R + 0.05 \Omega)$	
4.25.1	-	Endurance at 70 $^{\circ}\text{C}$	$U = \sqrt{P_{70}} \times R \leq U_{max.}$ ; 1.5 h on; 0.5 h off;  70 $^{\circ}\text{C}$ ; 1000 h  70 $^{\circ}\text{C}$ ; 8000 h	$\pm (1\% R + 0.05 \Omega)$  $\pm (2\% R + 0.1 \Omega)$	$\pm (2\% R + 0.1 \Omega)$  $\pm (4\% R + 0.1 \Omega)$
4.24	78 (Cab)	Damp heat, steady state	(40 $\pm$ 2) $^{\circ}\text{C}$ ; (93 $\pm$ 3) % RH; 56 days	$\pm (1\% R + 0.05 \Omega)$	
4.25.3	-	Endurance at upper category temperature	155 $^{\circ}\text{C}$ , 1000 h	$\pm (1\% R + 0.05 \Omega)$	

All tests are carried out in accordance with the following specifications:

- EN 60115-1, generic specification
- EN 140400, sectional specification
- EN 140401-802, detail specification
- IEC 60068-2, environmental test procedures

Packaging of components is done in paper or blister tapes according to IEC 60286-3.



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