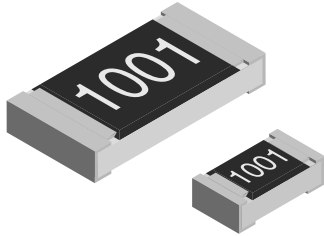


## Lead (Pb)-bearing Thick Film, Rectangular Precision Chip Resistor



### FEATURES

- Low temperature coefficient (25 ppm/K) and tight tolerances ( $\pm 0.25\%$ )
- Excellent stability ( $(|\Delta R/R| \leq \pm 1\%$  for 1000 h at 70 °C)
- SnPb contacts on Ni barrier layer
- Metal glaze on high quality ceramic
- Protective overglaze

STANDARD ELECTRICAL SPECIFICATIONS								
MODEL	SIZE		POWER RATING $P_{70^\circ\text{C}} \text{ W}$	LIMITING ELEMENT VOLTAGE MAX. $V_{\Xi}$	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE $\Omega$	E-SERIES
	INCH	METRIC						
D10/CRCW0402-P	0402	1005	0.063	50	$\pm 100$	$\pm 0.5$	10R - 1M0	24 + 96
					$\pm 50$	$\pm 0.25; \pm 0.5; \pm 1$	100R - 1M0	
					$\pm 25$	$\pm 0.5; \pm 1$	1K0 - 10K	
D11/CRCW0603-P	0603	1608	0.1	75	$\pm 100$	$\pm 0.5$	10R - 10M	24 + 96
					$\pm 50$	$\pm 0.5; \pm 1$	100R - 10M	
					$\pm 25$	$\pm 0.25$	100R - 1M0	
D12/CRCW0805-P	0805	2012	0.125	150	$\pm 100$	$\pm 0.5$	10R - 10M	24 + 96
					$\pm 50$	$\pm 0.5; \pm 1$	100R - 10M	
					$\pm 25$	$\pm 0.25$	100R - 1M0	
D25/CRCW1206-P	1206	3216	0.25	200	$\pm 100$	$\pm 0.5$	10R - 10M	24 + 96
					$\pm 50$	$\pm 0.5; \pm 1$	100R - 10M	
					$\pm 25$	$\pm 0.25$	100R - 1M0	
CRCW1210-P	1210	3225	0.33	200	$\pm 100$	$\pm 0.5$	10R - 10M	24 + 96
					$\pm 50$	$\pm 0.5; \pm 1$	100R - 1M0	
					$\pm 25$	$\pm 0.25; \pm 0.5; \pm 1$	150R - 10K	
CRCW1218-P	1218	3246	1.0	200	$\pm 100$	$\pm 0.5$	10R - 10M	24 + 96
					$\pm 50$	$\pm 0.5; \pm 1$	100R - 2M2	
					$\pm 25$	$\pm 0.5; \pm 1$	100R - 1M0	
CRCW2010-P	2010	5025	0.5	400	$\pm 100$	$\pm 0.5$	10R - 10M	24 + 96
					$\pm 50$	$\pm 0.5; \pm 1$	100R - 10M	
					$\pm 25$	$\pm 0.5; \pm 1$	100R - 1M0	
CRCW2512-P	2512	6332	1.0	500	$\pm 100$	$\pm 0.5$	10R - 10M	24 + 96
					$\pm 50$	$\pm 0.5; \pm 1$	100R - 10M	
					$\pm 25$	$\pm 0.5; \pm 1$	100R - 10M	

### 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 lifetime.
- Marking and packaging: see appropriate catalog or web pages
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material



Lead (Pb)-bearing Thick Film, Rectangular  
Precision Chip Resistor

TECHNICAL SPECIFICATIONS									
PARAMETER	UNIT	D10/ CRCW0402-P	D11/ CRCW0603-P	D12/ CRCW0805-P	D25/ CRCW1206-P	CRCW1210-P	CRCW1218-P	CRCW2010-P	CRCW2512-P
Rated Dissipation at 70 °C <sup>(3)</sup>	W	0.063	0.1	0.125	0.25	0.33	1	0.5	1
Limiting Element Voltage <sup>(2)</sup>	V <sub>≡</sub>	50	75	150	200	200	200	400	500
Insulation Voltage (1 min)	V <sub>peak</sub>	> 75	> 100	> 200	> 300	> 300	> 300	> 300	> 300
Thermal Resistance <sup>(1)</sup>	K/W	≤ 870	≤ 550	≤ 440	≤ 220	≤ 140	≤ 65	≤ 88	≤ 65
Insulation Resistance	Ω	> 10 <sup>9</sup>							
Category Temperature Range	°C	- 55 to + 155							
Failure Rate	h <sup>-1</sup>	0.3 x 10 <sup>-9</sup>							
Weight/1000 pieces	g	0.65	2	5.5	10	16	29.5	25.5	40.5

Notes

- <sup>(1)</sup> For sizes 0402 until 1206 the measuring conditions are in acc. to EN 140401-802. For all other sizes the result depends on the solder pad dimensions.
- <sup>(2)</sup> Rated voltage:  $\sqrt{P \times R}$
- <sup>(3)</sup> The power dissipation on the resistor 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.

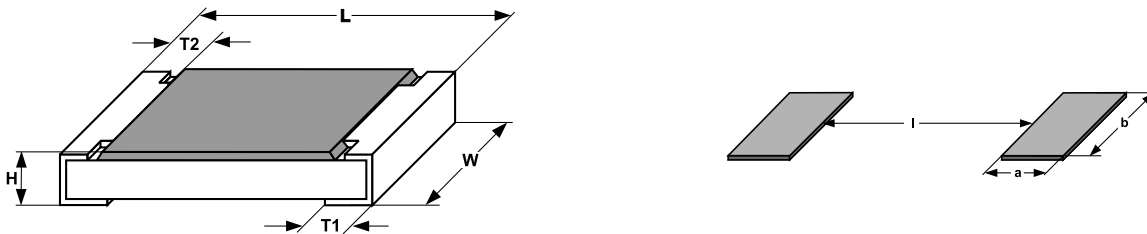
PART NUMBER AND PRODUCT DESCRIPTION																	
PART NUMBER: CRCW080525R0DKTAP <sup>(4)</sup>																	
C	R	C	W	0	8	0	5	2	5	R	0	D	K	T	A	P	
MODEL/SIZE		VALUE		TOLERANCE		TCR		PACKAGING <sup>(5)</sup>			SPECIAL						
CRCW0402 CRCW0603 CRCW0805 CRCW1206 CRCW1210 CRCW1218 CRCW2010 CRCW2512		R = Decimal K = Thousand M = Million		C = ± 0.25 % D = ± 0.5 % F = ± 1 %		E = ± 25 ppm/K H = ± 50 ppm/K K = ± 100 ppm/K		TA, TB, TC, TD, TE, TF, TG, TH, TI, TK, TL			up to 2 digits P = Precision						
PRODUCT DESCRIPTION: CRCW0805 25R0 D 100 RT1																	
CRCW0805		25R0		D		100		RT1									
MODEL		RESISTANCE VALUE		TOLERANCE		TCR		PACKAGING <sup>(5)</sup>									
CRCW0402 CRCW0603 CRCW0805 CRCW1206 CRCW1210 CRCW1218 CRCW2010 CRCW2512		49R9 = 49.9 Ω 5R1 = 5.1 Ω		C = ± 0.25 % D = ± 0.5 % F = ± 1 %		± 25 ppm/K ± 50 ppm/K ± 100 ppm/K		RT1, RT5, RT6, RT7 RT4, R02, R67, R82, RG1, RT9, R20									

Notes

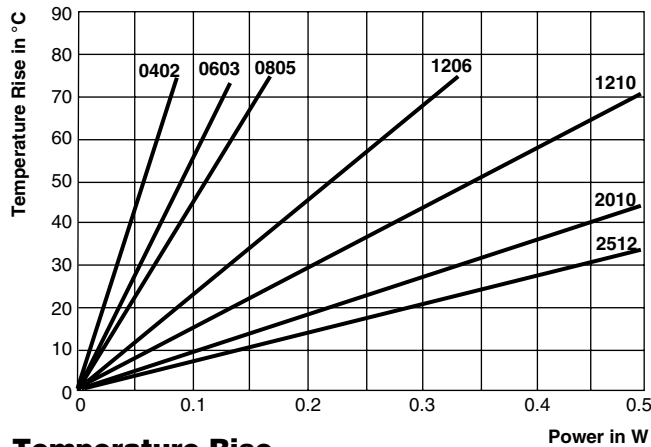
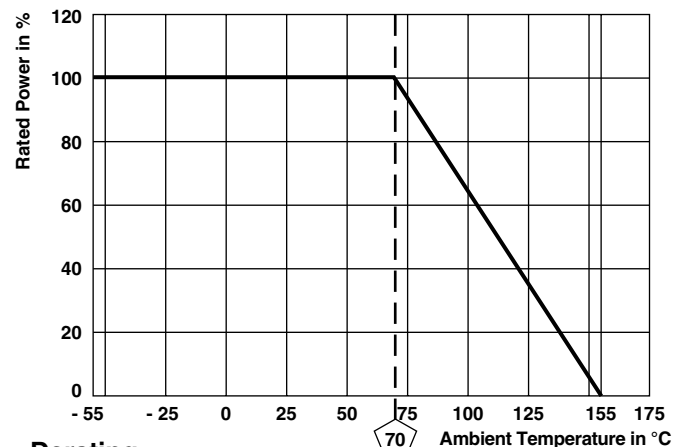
- <sup>(4)</sup> Preferred way for ordering products is by use of the PART NUMBER
- <sup>(5)</sup> Please refer to table PACKAGING, see next page

PACKAGING								
MODEL	REEL				PART NUMBER		BULK	
	TAPE WIDTH	DIAMETER	PITCH	PIECES/ REEL	PAPER	BLISTER	PAPER	BLISTER
					PRODUCT DESC.		PAPER	BLISTER
D10/ CRCW0402	8 mm	180 mm/7"	2 mm	10 000	TD		RT7	
		330 mm/13"	2 mm	50 000	TE		RF4	
D11/ CRCW0603	8 mm	180 mm/7"	4 mm	5000	TA	TI	RT1	RG1
		285 mm/11.25"	4 mm	10 000	TB		RT5	
		330 mm/13"	4 mm	20 000	TC	TL	RT6	R20
D12/ CRCW0805	8 mm	180 mm/7"	4 mm	5000	TA	TI	RT1	RG1
		285 mm/11.25"	4 mm	10 000	TB		RT5	
		330 mm/13"	4 mm	20 000	TC	TL	RT6	R20
D25/ CRCW1206	8 mm	180 mm/7"	4 mm	5000	TA	TI	RT1	RG1
		285 mm/11.25"	4 mm	10 000	TB		RT5	
		330 mm/13"	4 mm	20 000	TC	TL	RT6	R20
CRCW1210	8 mm	180 mm/7"	4 mm	5000	TA		RT1	
		285 mm/11.25"	4 mm	10 000	TB		RT5	
		330 mm/13"	4 mm	20 000	TC		RT6	
CRCW1218	12 mm	180 mm/7"	4 mm	4000		TK		RT9
CRCW2010	12 mm	180 mm/7"	4 mm	4000		TF		R02
CRCW2512	12 mm	180 mm/7"	8 mm	2000		TG		R67
			4 mm	4000		TH		R82

**DIMENSIONS**



SIZE		DIMENSIONS [in millimeters]					SOLDER PAD DIMENSIONS [in millimeters]					
							REFLOW SOLDERING			WAVE SOLDERING		
INCH	METRIC	L	W	H	T1	T2	a	b	l	a	b	l
0402	1005	1.0 ± 0.05	0.5 ± 0.05	0.35 ± 0.05	0.25 ± 0.05	0.2 ± 0.1	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	0.5	0.9	1.0	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	0.7	1.3	1.2	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	0.9	1.7	2.0	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	1.1	2.5	2.2
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	1.25	4.8	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	1.2	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	1.2	3.2	5.2

**Lead (Pb)-bearing Thick Film, Rectangular  
Precision Chip Resistor**

**Temperature Rise**

**Derating**
**TEST PROCEDURES AND REQUIREMENTS**

EN 60115-1		
TEST (clause)	CONDITIONS OF TEST	REQUIREMENTS
		PERMISSIBLE CHANGE ( $\Delta R/R$ )
	Stability for product types:	STABILITY CLASS 1 OR BETTER
	<b>D../CRCW....-P</b>	10R to 10M
Resistance (4.5)	-	$\pm 1\%$ ; $\pm 0.5\%$ ; $\pm 0.25\%$
Temperature coefficient (4.8.4.2)	20/- 55/20 °C and 20/125/20 °C	$\pm 100$ ppm/K; $\pm 50$ ppm/K; $\pm 100$ ppm/K
Overload (4.13)	$U = 2.5 \times (P_{70} \times R)^{1/2}$ $\leq 2 \times U_{max.}$ ; Duration: according the style	$\pm (0.25\% R + 0.05 \Omega)$
Solderability (4.17.5)	Aging 4 h at 155 °C, dryheat solder bath method; 235 °C; 2 s visual examination	Good tinning ( $\geq 95\%$ covered) no visible damage
Resistance to soldering heat (4.18.2)	Solder bath method; (260 $\pm$ 5) °C; (10 $\pm$ 1) s	$\pm (0.25\% R + 0.05 \Omega)$
Rapid change of temperature (4.19)	30 min at LCT = - 55 °C; 30 min at UCT = 125 °C; 5 cycles	$\pm (0.25\% R + 0.05 \Omega)$
Damp heat, steady state (4.24)	(40 $\pm$ 2) °C; 56 days; (93 $\pm$ 3) % RH	$\pm (1\% R + 0.05 \Omega)$
Climatic sequence (4.23)	16 h at UCT = 125 °C; 1 cycle at 55 °C; 2 h at LCT = - 55 °C; 1 h/1 kPa at 15 °C to 35 °C; 5 cycles at 55 °C $U = (P_{70} \times R)^{1/2}$ $U = U_{max.}$ ; whichever is less severe	$\pm (1\% R + 0.05 \Omega)$
Endurance at 70 °C (4.25.1)	$U = (P_{70} \times R)^{1/2}$ $U = U_{max.}$ ; whichever is less severe 1.5 h ON; 0.5 h OFF; 70 °C; 1000 h	$\pm (1\% R + 0.05 \Omega)$
Extended endurance (4.25.1.8)	Duration extended to 8000 h	$\pm (2\% R + 0.1 \Omega)$
Endurance at upper category temperature (4.25.3)	UCT = 125 °C; 1000 h	$\pm (1\% R + 0.05 \Omega)$

**APPLICABLE SPECIFICATIONS**

• EN 60115-1	Generic Specifications
• EN 140400	Sectional Specification
• EN 140401-802	Detail Specifications
• IEC 60068-2-x	Variety of environmental test procedures
• IEC 60286-3	Packaging of SMD components



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