

Lead (Pb)-bearing Thick Film, Rectangular Chip Resistors



FEATURES

- High volume product suitable for commercial and special applications
- Excellent stability ($\triangle R/R \le \pm 1$ % for 1000 h at 70 °C)
- Lead (Pb)-bearing solder contacts on Ni barrier layer
- Metal glaze on high quality ceramic
- Protective overglaze

STANDARD	ELEC	TRICA	L SPECIFICATION	NS				
MODEL	5	SIZE	POWER RATING P _{70°C}	LIMITING ELEMENT VOLTAGE	TEMPERATURE COEFFICIENT	TOLERANCE	RESISTANCE RANGE	E-SERIES
	INCH	METRIC	W	MAX. V≅	ppm/K	/6	Ω	
D10/CRCW0402	0402	1005	0.063	50	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
			Zero-Ohm-Resistor: R _{ma}	$_{\rm x.}$ = 20 m Ω , $I_{\rm max}$	ax. at 70 °C = 1.5 A			
D11/CRCW0603	0603	1608	0.10	75	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
			Zero-Ohm-Resistor: R _{ma}	$_{\rm x.}$ = 20 m Ω , $I_{\rm max}$	_{ax.} at 70 °C = 2.0 A			
D12/CRCW0805	0805	2012	0.125	150	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
			Zero-Ohm-Resistor: R _{ma}	$_{\rm x.}$ = 20 m Ω , $I_{\rm max}$	ax. at 70 °C = 2.5 A			
D25/CRCW1206	1206	3216	0.25	200	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
			Zero-Ohm-Resistor: R _{ma}	$_{\rm x.}$ = 20 m Ω , $I_{\rm max}$	ax. at 70 °C = 3.5 A	% ± 1 ± 5 ± 1 ± 5 ± 1 ± 5 ± 1 ± 5		
CRCW1210	1210	3225	0.33	200	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
			Zero-Ohm-Resistor: R _{ma}	$_{\rm x.}$ = 20 m Ω , $I_{\rm max}$	ax. at 70 °C = 4.0 A			
CRCW1218	1218	3246	1.0	200	± 100 ± 200		1R0 - 2M2	24 + 96 24
			Zero-Ohm-Resistor: R _{ma}	$_{\rm x.}$ = 20 m Ω , $I_{\rm max}$	ax. at 70 °C = 7.0 A			
CRCW2010	2010	5025	0.50	400	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
			Zero-Ohm-Resistor: R _{ma}	$_{\rm x.} = 20 \text{ m}\Omega$, $I_{\rm max}$	$_{ix.}$ at $\overline{70 ^{\circ}C} = 5.0 A$			
CRCW2512	2512	6332	1.0	500	± 100 ± 200		1R0 - 10M	24 + 96 24
			Zero-Ohm-Resistor: R _{ma}	$_{\rm x.}$ = 20 m Ω , $I_{\rm max}$	at 70 °C = 7.0 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 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



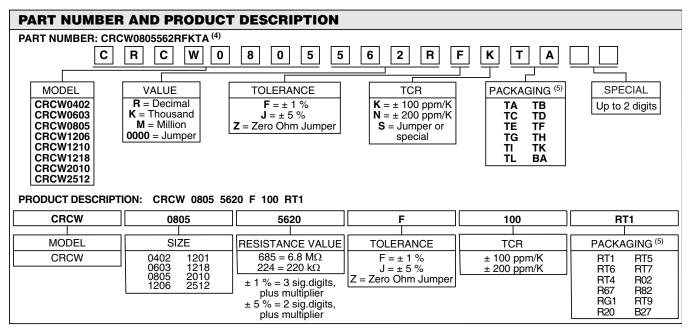
Lead (Pb)-bearing Thick Film, Rectangular Chip Resistors

Vishay

TECHNICAL SPECIFICATIONS										
PARAMETER	UNIT	D10/ CRCW0402	D11/ CRCW0603	D12/ CRCW0805	D25/ CRCW1206	CRCW1210	CRCW1218	CRCW2010	CRCW2512	
Rated Dissipation at 70 °C (3)	W	0.063	0.1	0.125	0.25	0.33	1.0	0.5	1.0	
Limiting Element Voltage (2)	V≅	50	75	150	200	200	200	400	500	
Insulation Voltage (1 min)	V_{peak}	> 75	> 100	> 200	> 300	> 300	> 300	> 300	> 300	
Thermal Resistance (1)	K/W	≤ 870	≤ 550	≤ 440	≤ 220	≤ 140	≤ 65	≤ 88	≤ 65	
Insulation Resistance	Ω		> 10 ⁹							
Category Temperature Range °C - 55 to + 155										
Failure Rate h-1 0.3 x 10 ⁻⁹										
Weight/1000 pieces	g	0.65	2	5.5	10	16	29.5	25.5	40.5	

Notes

- (1) 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.
- (2) Rated voltage: \sqrt{PxR}
- (3) 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.



Notes

(4) Preferred way for ordering products is by use of the PART NUMBER

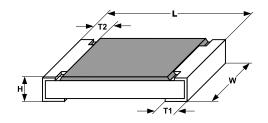
⁽⁵⁾ Please refer to table PACKAGING, see next page

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PACKAGING											
			BULK								
MODEL				DIE050/		PACKAGI	NG COD		PACKAGING CODE		
MODEL	TAPE WIDTH	DIAMETER	PITCH	PIECES/ REEL	PART NUMBER		PRODUCT DESC.		PIECES	PART	PRODUCT
					PAPER	BLISTER	PAPER	BLISTER		NUMBER	DESC.
D10/CRCW0402	8 mm	180 mm/7"	2 mm	10 000	TD		RT7		50 000	ВА	B27
D10/CRCW0402	0 111111	330 mm/13"	2 mm	50 000	TE		RF4		50 000		
		180 mm/7"	4 mm	5000	TA	TI	RT1	RG1			
D11/CRCW0603	8 mm	285 mm/11.25"	4 mm	10 000	TB		RT5		25 000	BA	B27
		330 mm/13"	4 mm	20 000	TC	TL	RT6	R20			
	8 mm	180 mm/7"	4 mm	5000	TA	TI	RT1	RG1			
D12/CRCW0805		285 mm/11.25"	4 mm	10 000	TB		RT5		10 000	BA	B27
		330 mm/13"	4 mm	20 000	TC	TL	RT6	R20			
	8 mm	180 mm/7"	4 mm	5000	TA	TI	RT1	RG1			
D25/CRCW1206		285 mm/11.25"	4 mm	10 000	TB		RT5				
D25/CHCW 1200		330 mm/13"	4 mm	15 000		TL		R20			
		330 mm/13"	4 mm	20 000	TC		RT6				
		180 mm/7"	4 mm	5000	TA		RT1				
CRCW1210	12 mm	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			
CDCW2E12	12 mm	180 mm/7"	8 mm	2000		TG		R67			
CRCW2512	12 111111	180 mm/7"	4 mm	4000		TH		R82			

DIMENSIONS



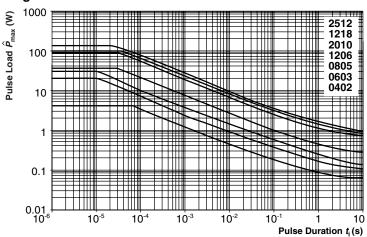


SIZE DIMENSIONS (in millimeters)							SOLDER PAD DIMENSIONS [in millimeters]						
5	οίζΕ		DIMENS	DIMENSIONS [in millimeters]					ERING	WAVE SOLDERING			
INCH	METRIC	L	w	Н	T1	T2	а	b	I	а	b	I	
0402	1005	1.0 ± 0.05	0.5 ± 0.05	0.35 ± 0.05	0.25 ± 0.05	0.2 ± 0.1	0.4	0.6	0.5				
0603	1608	1.55 + 0.10	0.85 ± 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 + 0.20 - 0.10	1.25 ± 0.15	0.45 ± 0.05	0.3 + 0.20 - 0.10	0.3 ± 0.2	0.7	1.3	1.2	0.9	1.3	1.3	
1206	3216	3.2 + 0.10	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 + 0.10 - 0.20	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	



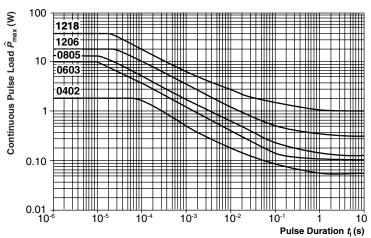
FUNCTIONAL PERFORMANCE

Single Pulse



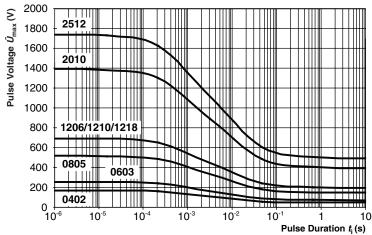
Maximum pulse load, single pulse; applicable if \bar{P} \rightarrow 0 and n \leq 1000 and $\hat{U} \leq \hat{U}_{max}$; for permissible resistance change equivalent to 8000 h operation

Continuous Pulse



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

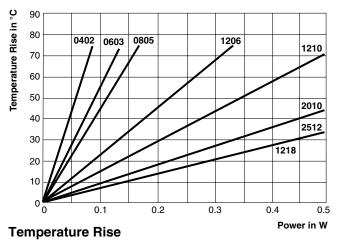
Pulse Voltage

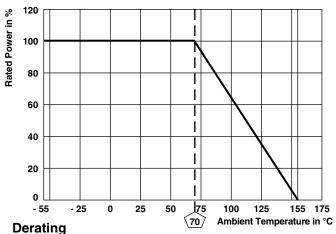


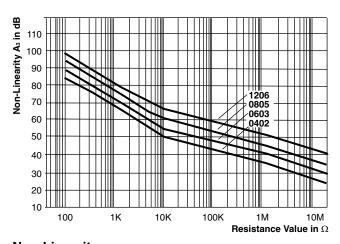
Maximum pulse voltage, single and continuous pulses; applicable if $\hat{P} \leq \hat{P}_{\max}$; for permissible resistance change equivalent to 8000 h operation

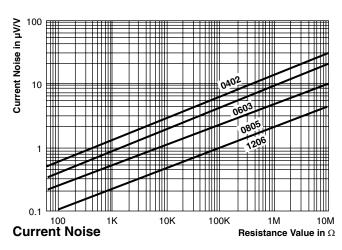
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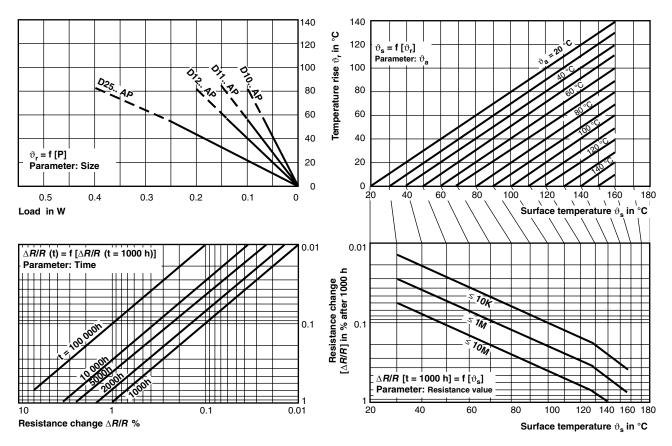




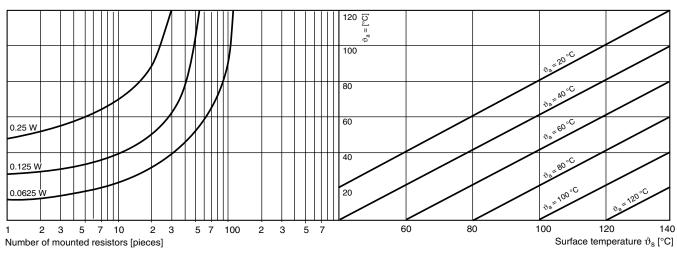
Non-Linearity



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Stability nomogram typical values (for handling see general explanations)



Power rating as a function of packaging density (guideline)

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TEST PROCEDURES AND REQUIREMENTS EN 60115-1										
TEST (clause)	CONDITIONS OF TEST	STABILITY CLASS 1 OR BETTER	STABILITY CLASS 2 OR BETTER							
	Stability for product types:	1 Ω to 10 MΩ	1 Ω to 10 MΩ							
	D/CRCW	1 52 to 10 MS2	1 22 to 10 10is2							
Resistance (4.5)	-	± 1 %	± 5 %							
Temperature coefficient (4.8.4.2)	20/- 55/20 °C and 20/125/20 °C	± 100 ppm/K	± 200 ppm/K							
Overload (4.13)	$U = 2.5 \times (P_{70} \times R)^{1/2}$ $\leq 2 \times U_{\text{max.}};$ Duration: according the style	± (0.25 % R + 0.05 Ω)	± (0.5 % R + 0.05 Ω)							
Solderability (4.17.5)	Aging 4 h at 155 °C, dryheat solder bath method; 235 °C; 2 s visual examination	Good tinning (≥ 95 % covered) no visible damage								
Resistance to soldering heat (4.18.2)	Solder bath method; (260 ± 5) °C; (10 ± 1) s	± (0.25 % R + 0.05 Ω)	± (0.5 % R + 0.05 Ω)							
Rapid change of temperature (4.19)	30 min at LCT = - 55 °C; 30 min at UCT = 125 °C; 5 cycles	± (0.25 % R + 0.05 Ω)	± (0.5 % R + 0.05 Ω)							
Damp heat, steady state (4.24)	(40 ± 2) °C; 56 days; (93 ± 3) % RH	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)							
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 $U = (P_{70} \times R)^{1/2}$ $U = U_{\text{max.}}$; whichever is less severe	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)							
Endurance at 70 °C (4.25.1)	$U = (P_{70} \times R)^{1/2}$ $U = U_{\text{max}}$; whichever is less severe 1.5 h ON; 0.5 h OFF; 70 °C; 1000 h	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)							
Extended endurance (4.25.1.8)	Duration extended to 8000 h	± (2 % R + 0.1 Ω)	± (4 % R + 0.1 Ω)							
Endurance at upper category temperature (4.25.3)	UCT = 125 °C; 1000 h	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)							

APPLICABLE SPECIFICATIONS

EN 60115-1 Generic specification
 EN 140400 Sectional specification
 EN 140401-802 Detail specification

IEC 60068-2-X
 Variety of environmental test procedures

IEC 60286-3 Packaging of SMD components

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