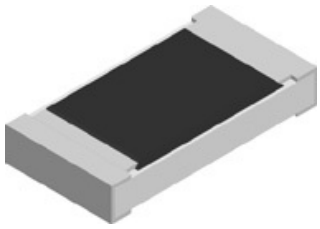
Lead (Pb)-bearing Thick Film, Rectangular, Trimmable Chip Resistors



FEATURES

- Can be trimmed to the required value after insertion
- For applications in precision circuitry where relative tolerances can be compensated by trimming
- SnPb contacts on Ni barrier layer
- Metal glaze on high quality ceramic
- Protective overglaze

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE		POWER RATING $P_{70\,°C}$ W	LIMITING ELEMENT VOLTAGE MAX V≅	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE Ω	E-SERIES
	INCH	METRIC						
D10/CRCW0402-TR	0402	1005	0.063	50	± 100 ± 200	± 10 ± 15 ± 20 + 0/- 10 + 0/- 20 + 0/- 30	10R - 10M R47 - 10M	24
D11/CRCW0603-TR	0603	1608	0.10	75	± 100 ± 200		10R - 10M R47 - 10M	24
D12/CRCW0805-TR	0805	2012	0.125	150	± 100 ± 200		10R - 10M R47 - 10M	24
D25/CRCW1206-TR	1206	3216	0.25	200	± 100 ± 200		10R - 10M R47 - 10M	24
CRCW1210-TR	1210	3225	0.33	200	± 200		10R - 4M7	24
CRCW2010-TR	2010	5025	0.50	200	± 400		10R - 4M7	24
CRCW2512-TR	2512	6332	1.0	200	± 500		10R - 4M7	24

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: No marking on device, on the label only
- 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

TECHNICAL SPECIFICATIONS

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

Notes

(1) For size 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: $\sqrt{P \times R}$

(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.

For technical questions, contact: filmresistors.thickfilmchip@vishay.com
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Revision: 13-Oct-08

PART NUMBER AND PRODUCT DESCRIPTION

PART NUMBER: CRCW080525R0KKTATR (1)

C	R	C	W	0	8	0	5	2	5	R	0	K	K	T	A	T	R

MODEL	VALUE	TOLERANCE	TCR	PACKAGING (2)	SPECIAL
CRCW0402 **CRCW0603** **CRCW0805** **CRCW1206** **CRCW1210** **CRCW2010** **CRCW2512**	**R** = Decimal **K** = Thousand **M** = Million	**K** = ± 10 % **L** = ± 15 % **M** = ± 20 % **U** = + 0 %/- 10 % **V** = + 0 %/- 20 % **W** = + 0 %/- 30 %	**K** = ± 100 ppm/K **N** = ± 200 ppm/K	**TA, TB,** **TC, TD,** **TE, TF,** **TG, TH,** **TI, TL**	up to 2 digits **TR** = Customer Trimmable

PRODUCT DESCRIPTION: CRCW0805-TR 250 K 100 RT1

CRCW0805-TR	250	K	100	RT1
MODEL	RESISTANCE VALUE	TOLERANCE	TCR	PACKAGING (2)
CRCW0402-TR **CRCW0603-TR** **CRCW0805-TR** **CRCW1206-TR** **CRCW1210-TR** **CRCW2010-TR** **CRCW2512-TR**	**250** = 25R **392** = 3K9 **105** = 1M0	**K** = ± 10 % **L** = ± 15 % **M** = ± 20 % **U** = + 0 %/- 10 % **V** = + 0 %/- 20 % **W** = + 0 %/- 30 %	± 100 ppm/K ± 200 ppm/K	RT1, RT5, RT6, RT7, RF4, R02, R67, R82, RG1, R20

Notes

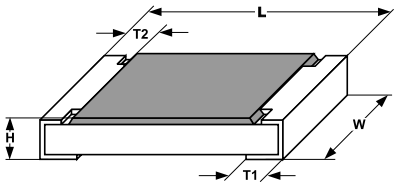
(1) Preferred way for ordering products is by use of the PART NUMBER

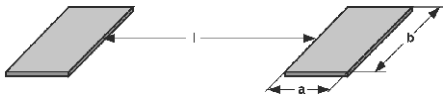
(2) Please refer to table PACKAGING, see below

PACKAGING

MODEL	REEL							
	TAPE WIDTH	DIAMETER	PITCH	PIECES/REEL	PACKING CODE			
					PART NUMBER		PRODUCT DESC.	
					PAPER	BLISTER	PAPER	BLISTER
D10/CRCW0402-TR	8 mm	180 mm/7"	2 mm	10 000	TD		RT7	
		330 mm/13"	2 mm	50 000	TE		RF4	
D11/CRCW0603-TR	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	RG20
D12/CRCW0805-TR	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	RG20
D25/CRCW1206TR	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	RG20
CRCW1210TR	12 mm	180 mm/7"	4 mm	5000	TA		RT1	
		330 mm/13"	4 mm	20 000	TC		RT6	
CRCW2010TR	12 mm	180 mm/7"	4 mm	4000		TF		R02
CRCW2512TR	12 mm	180 mm/7"	8 mm	2000		TG		R67
			4 mm	4000		TH		R82

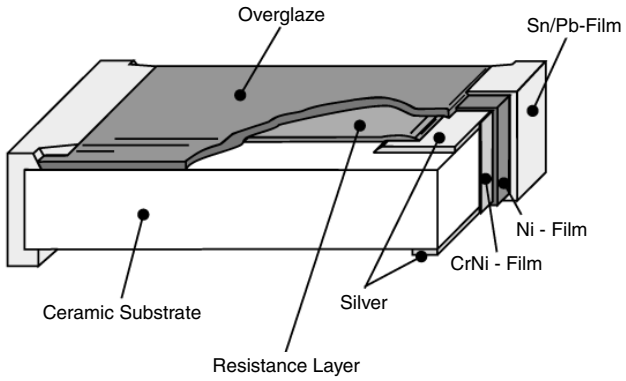
DIMENSIONS





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 $^{+0.10}_{-0.05}$	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 $^{+0.10}_{-0.20}$	1.6 ± 0.15	0.55 $^{+0.05}_{-0.10}$	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
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

TRIMMING INSTRUCTIONS

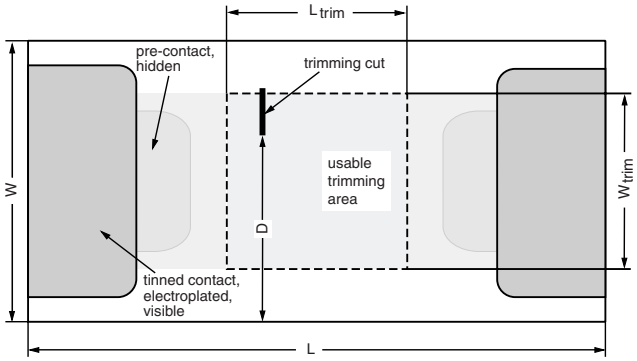


YAG-Laser:
Maximum trimming factor =
1.6 for an I-cut and 1.8 for a L-cut

Double cut:
Distance between two cuts = 0.5 mm min

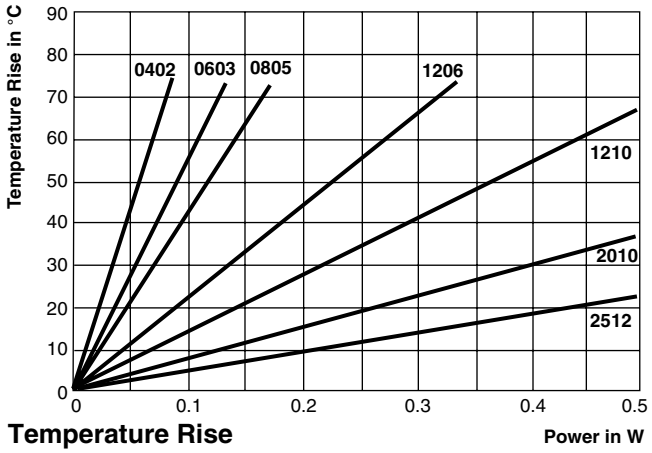
The laser-cut should be protected with epoxy resins

PERMISSIBLE TRIMMING AREA

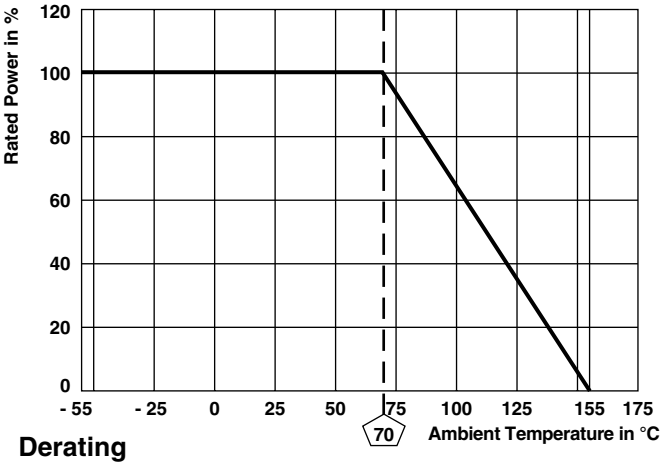


DIMENSIONS OF THE PERMISSIBLE					
MODEL	L	W	L_{trim}	W_{trim}	D
D10/CRCW0402-TR (1)	1.0	0.5	≤ 0.25	0.27	≥ 0.25
D11/CRCW0603-TR (1)	1.55	0.85	≤ 0.425	0.5	≥ 0.425
D12/CRCW0805-TR	2.0	1.25	≤ 0.625	0.85	≥ 0.625
D25/CRCW1206-TR	3.2	1.6	≤ 0.8	1.0	≥ 0.8
CRCW1210-TR	3.2	2.5	≤ 1.25	1.6	≥ 1.25
CRCW2010-TR	5.0	2.5	≤ 1.25	1.9	≥ 1.25
CRCW2512-TR	6.3	3.15	≤ 1.575	2.4	≥ 1.575

Note
(1) Single cut only



Temperature Rise



Derating

TEST PROCEDURES AND REQUIREMENTS

EN 60115-1			
TEST (clause)	**CONDITIONS OF TEST**	**REQUIREMENTS PERMISSIBLE CHANGE ($\Delta R/R$) (1)**	
		STABILITY CLASS 1 OR BETTER	**STABILITY CLASS 2 OR BETTER**
	Stability for product types: **D../CRCW....-TR e3**	10R - 10M	R47 - 10M
Resistance (4.5)	-	± 10; ± 15; ± 20; + 0/- 30 %	
Temperature coefficient (4.8.4.2)	20/- 55/20 °C and 20/125/20 °C	± 100 ppm/K	± 200 ppm/K
Overload (4.13)	$U = 2.5 \times (P_{70} \times R)^{1/2}$ $\leq 2 \times U_{max.}$; 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 $U = (P_{70} \times R)^{1/2}$ $U = U_{max.}$; whichever is less severe	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)
Endurance at 70 °C (4.25.1)	$U = (P_{70} \times R)^{1/2}$ $U = U_{max.}$; 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)

Note

(1) Data is valid for non trimmed resistors only. Depending on the trimming process some properties can change.

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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All product specifications and data are subject to change without notice.

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