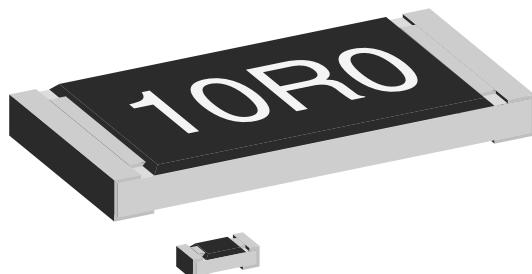


Standard Thick Film Chip Resistors



FEATURES

- Stability $\Delta R/R = 1\%$ for 1000 h at 70 °C
- 2 mm pitch packaging option for 0603 size
- Pure tin solder contacts on Ni barrier layer provides compatibility with lead (Pb)-free and lead containing soldering processes
- Metal glaze on high quality ceramic
- AEC-Q200 qualified
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

STANDARD ELECTRICAL SPECIFICATIONS									
MODEL	SIZE		RATED DISSIPATION $P_{70\text{ °C}}$ W	LIMITING ELEMENT VOLTAGE $U_{\text{max. AC/DC}}$	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE Ω	SERIES	
	INCH	METRIC							
D10/CRCW0402	0402	RR 1005M	0.063	50	± 100 ± 200	± 1 ± 5	1R0 to 10M		
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20 \text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 1.5 A						
D11/CRCW0603	0603	RR 1608M	0.10	75	± 100 ± 200	± 1 ± 5	1R0 to 10M		
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20 \text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 2.0 A						
D12/CRCW0805	0805	RR 2012M	0.125	150	± 100 ± 200	± 1 ± 5	1R0 to 10M		
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20 \text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 2.5 A						
D25/CRCW1206	1206	RR 3216M	0.25	200	± 100 ± 200	± 1 ± 5	1R0 to 10M		
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20 \text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 3.5 A						
CRCW1210	1210	RR 3225M	0.5	200	± 100 ± 200	± 1 ± 5	1R0 to 10M		
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20 \text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 5.0 A						
CRCW1218	1218	RR 3246M	1.0	200	± 100 ± 200	± 1 ± 5	1R0 to 2M2		
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20 \text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 7.0 A						
CRCW2010	2010	RR 5025M	0.75	400	± 100 ± 200	± 1 ± 5	1R0 to 10M		
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20 \text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 6.0 A						
CRCW2512	2512	RR 6332M	1.0	500	± 100 ± 200	± 1 ± 5	1R0 to 10M		
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20 \text{ m}\Omega$, $I_{\text{max.}}$ 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: See data sheet "Surface Mount Resistor Marking" (document number 20020).
- 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	D11/ CRCW0603	D12/ CRCW0805	D25/ CRCW1206	CRCW1210	CRCW1218	CRCW2010	CRCW2512
Rated dissipation P_{70} ⁽¹⁾	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 min)	V	> 75	> 100	> 200	> 300	> 300	> 300	> 300	> 300
Insulation resistance	Ω	$> 10^9$							
Category temperature range	$^{\circ}$ C	- 55 to + 155							
Failure rate	h^{-1}	$< 0.1 \times 10^{-9}$							
Weight	mg	0.65	2	5.5	10	16	29.5	25.5	40.5

Note

(1) 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: CRCW0603562RFKEC

C	R	C	W	0	6	0	3	5	6	2	R	F	K	E	C		
MODEL			VALUE			TOLERANCE			TCR			PACKAGING			SPECIAL		
CRCW0402			R = Decimal			F = $\pm 1.0\%$			K = ± 100 ppm/K			EA, EB,			Up to 2 digits		
CRCW0603			K = Thousand			J = $\pm 5.0\%$			N = ± 200 ppm/K			EC, ED,					
CRCW0805			M = Million			Z = Jumper			0 = Jumper			EE, EF,					
CRCW1206												EG, EH,					
CRCW1210												EI, EL,					
CRCW1218												EK					
CRCW2010																	
CRCW2512																	

Product Description: D11/CRCW0603 100 562R 1 % ET6 e3

D11/CRCW0603	100	562R	1 %	ET6	e3
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING	LEAD (Pb)-FREE
D10/CRCW0402 D11/CRCW0603 D12/CRCW0805 D25/CRCW1206 CRCW1210 CRCW1218 CRCW2010 CRCW2512	± 200 ppm/K ± 100 ppm/K	10R = 10 Ω 562R = 562 Ω 10K = 10 k Ω 1M0 = 1 M Ω 0R0 = Jumper	$\pm 5\%$ $\pm 1\%$	ET1, ET2, ET3, ET4, ET5, ET6, ET7, ET8, ET9, EF4, E02, E67, E82	$\mathbf{e3}$ = Pure tin termination finish

PACKAGING						
MODEL	CODE	QUANTITY	CARRIER TAPE	WIDTH	PITCH	REEL DIAMETER
CRCW0402	ED = ET7 EE = EF4	10 000 50 000	Paper tape acc. to IEC 60068-3 Type I	8 mm	2 mm	180 mm/7" 330 mm/13"
CRCW0603	EI = ET2	5000		8 mm	2 mm	180 mm/7" 180 mm/7" 285 mm/11.25" 330 mm/13"
	ED = ET3	10 000		8 mm	4 mm	180 mm/7" 285 mm/11.25" 330 mm/13"
	EL = ET4	20 000		8 mm	4 mm	180 mm/7" 285 mm/11.25" 330 mm/13"
CRCW0805	EE = ET8	50 000		8 mm	4 mm	180 mm/7" 285 mm/11.25" 330 mm/13"
	EA = ET1	5000		8 mm	4 mm	180 mm/7" 285 mm/11.25" 330 mm/13"
	EB = ET5	10 000		8 mm	4 mm	180 mm/7" 285 mm/11.25" 330 mm/13"
CRCW1206	EC = ET6	20 000		8 mm	4 mm	180 mm/7" 285 mm/11.25" 330 mm/13"
	EA = ET1	5000	Blister tape acc. to IEC 60068-3 Type II	12 mm	4 mm	180 mm/7"
	EB = ET5	10 000		12 mm	4 mm	180 mm/7"
CRCW1210	EC = ET6	20 000		12 mm	8 mm 4 mm	180 mm/7" 285 mm/11.25" 330 mm/13"
CRCW1218	EK = ET9	4000		12 mm	4 mm	180 mm/7"
CRCW2010	EF = E02	4000		12 mm	4 mm	180 mm/7"
CRCW2512	EG = E67 EH = E82	2000 4000		12 mm	8 mm 4 mm	180 mm/7"

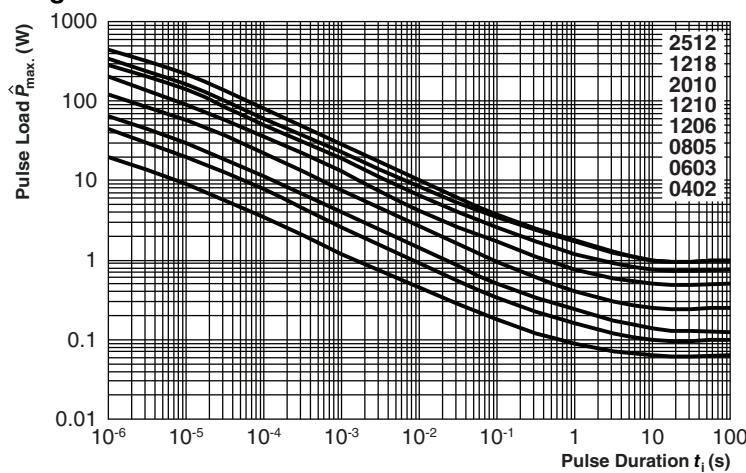
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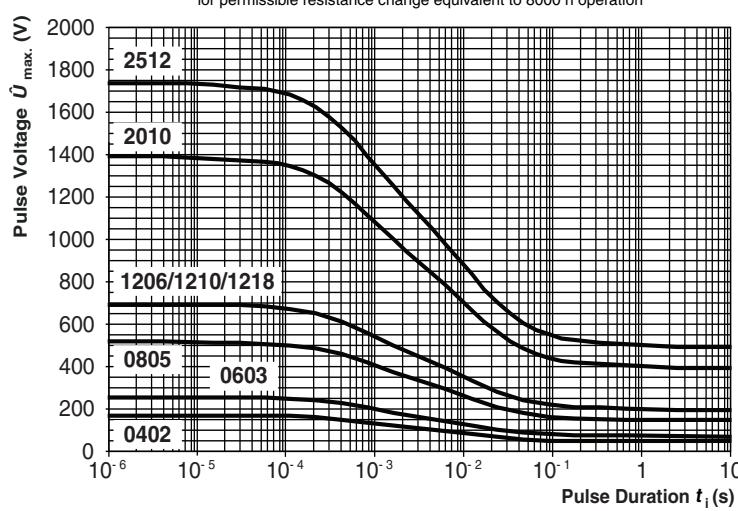
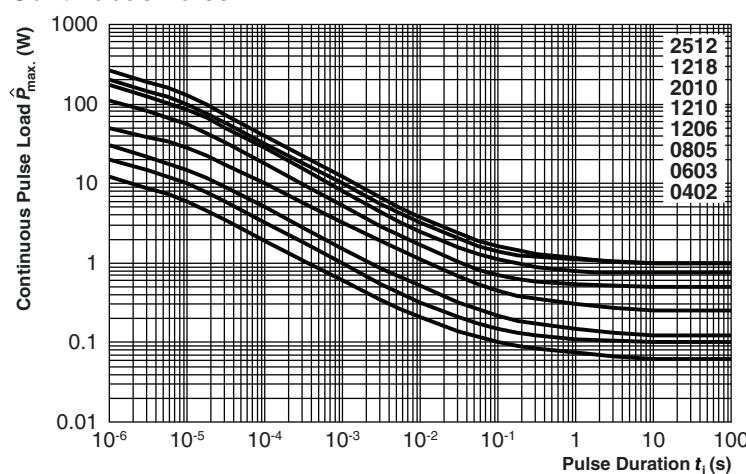
SIZE		DIMENSIONS in millimeters					SOLDER PAD DIMENSIONS in millimeters					
							REFLOW SOLDERING			WAVE SOLDERING		
INCH	METRIC	L	W	H	T1	T2	a	b	I	a	b	I
0402	1005	1.0 ± 0.05	0.5 ± 0.05	0.35 ± 0.05	0.25 ± 0.05	0.2 ± 0.1	0.4	0.6	0.5			
0603	1608	1.55 ^{+0.10} _{-0.05}	0.85 ± 0.1	0.45 ± 0.05	0.3 ± 0.2	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	0.45 ± 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

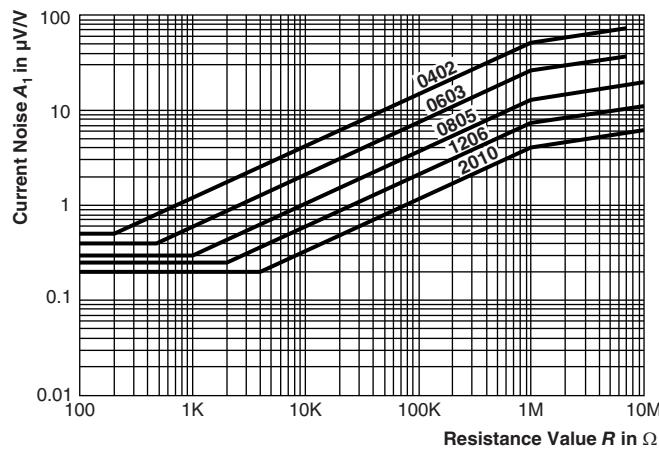
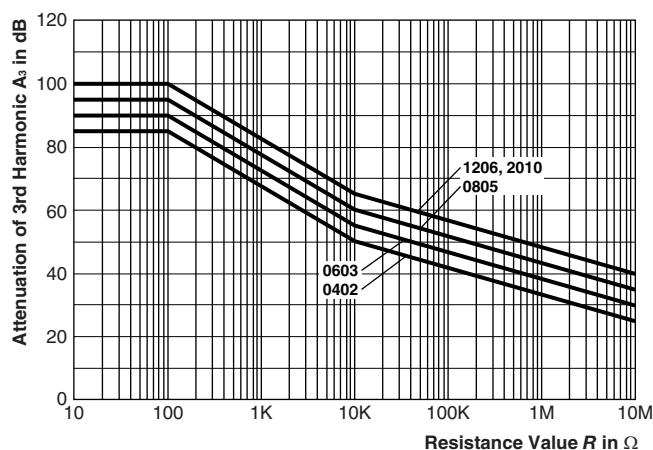
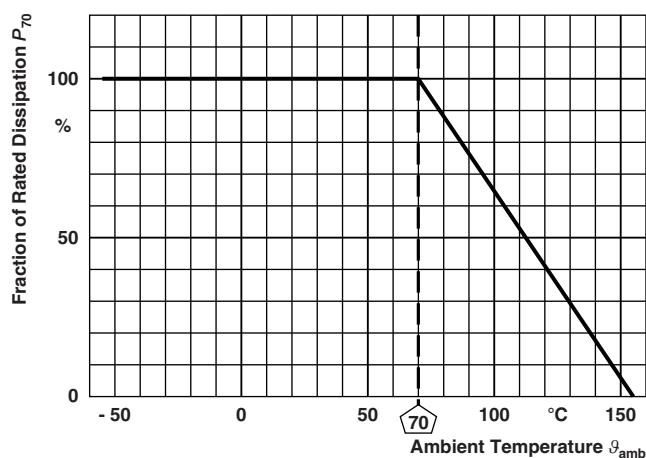
Single Pulse



Continuous Pulse



Derating



TEST PROCEDURES AND REQUIREMENTS							
EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)			
				SIZE 0402 to 2512			
				STABILITY CLASS 1 OR BETTER	STABILITY CLASS 2 OR BETTER		
			Stability for product types:	1 Ω to 10 M Ω			
			D/CRCW e3				
4.5	-	Resistance	-	$\pm 1\%$	$\pm 5\%$		
4.7	-	Voltage proof	$U = 1.4 \times U_{ins}$; 60 s	No flashover or breakdown			
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70} \times R}$ $\leq 2 \times U_{max}$; duration: Acc. to style	$\pm (0.25\% R + 0.05 \Omega)$	$\pm (0.5\% R + 0.05 \Omega)$		
4.17.2	58 (Td)	Solderability	Solder bath method; Sn60Pb40 non activated flux; (235 \pm 5) $^{\circ}$ C (2 \pm 0.2) s	Good tinning ($\geq 95\%$ covered) no visible damage			
			Solder bath method; Sn96.5Ag3Cu0.5 non-activated flux; (245 \pm 5) $^{\circ}$ C (3 \pm 0.3) s	Good tinning ($\geq 95\%$ covered) no visible damage			
4.8.4.2	-	Temperature coefficient	(20/- 55/20) $^{\circ}$ C and (20/125/20) $^{\circ}$ C	± 100 ppm/K	± 200 ppm/K		
4.32	21 (Uu ₃)	Shear (adhesion)	RR 1608 and smaller: 9 N RR 2012 and larger: 45 N	No visible damage			
4.33	21 (Uu ₁)	Substrate bending	Depth 2 mm; 3 times	No visible damage, no open circuit in bent position $\pm (0.25\% R + 0.05 \Omega)$			
4.19	14 (Na)	Rapid change of temperature	30 min. at - 55 $^{\circ}$ C; 30 min. at 125 $^{\circ}$ C 5 cycles 1000 cycles	$\pm (0.25\% R + 0.05 \Omega)$ $\pm (1\% R + 0.05 \Omega)$	$\pm (0.5\% R + 0.05 \Omega)$ $\pm (1\% R + 0.05 \Omega)$		
4.23	-	Climatic sequence:	-				
4.23.2	2 (Ba)	Dry heat	125 $^{\circ}$ C; 16 h				
4.23.3	30 (Db)	Damp heat, cyclic	55 $^{\circ}$ C; $\geq 90\%$ RH; 24 h; 1 cycle				
4.23.4	1 (Aa)	Cold	- 55 $^{\circ}$ C; 2 h	$\pm (1\% R + 0.05 \Omega)$	$\pm (2\% R + 0.1 \Omega)$		
4.23.5	13 (M)	Low air pressure	1 kPa; (25 \pm 10) $^{\circ}$ C; 1 h				
4.23.6	30 (Db)	Damp heat, cyclic	55 $^{\circ}$ C; $\geq 90\%$ RH; 24 h; 5 cycles				
4.23.7	-	DC load	$U = \sqrt{P_{70} \times R}$				
4.25.1	-	Endurance at 70 $^{\circ}$ C	$U = \sqrt{P_{70} \times R} \leq U_{max}$; 1.5 h on; 0.5 h off;				
			70 $^{\circ}$ C; 1000 h	$\pm (1\% R + 0.05 \Omega)$	$\pm (2\% R + 0.1 \Omega)$		
			70 $^{\circ}$ C; 8000 h	$\pm (2\% R + 0.1 \Omega)$	$\pm (4\% R + 0.1 \Omega)$		

TEST PROCEDURES AND REQUIREMENTS							
EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)			
				SIZE 0402 to 2512			
				STABILITY CLASS 1 OR BETTER	STABILITY CLASS 2 OR BETTER		
			Stability for product types:	1 Ω to 10 $M\Omega$			
			D/CRCW e3				
4.18.2	58 (Td)	Resistance to soldering heat	Solder bath method (260 ± 5) $^{\circ}\text{C}$; (10 ± 1) s	$\pm (0.25 \% R + 0.05 \Omega)$	$\pm (0.5 \% R + 0.05 \Omega)$		
4.35	-	Flamability, needle flame test	IEC 60695-11-5; 10 s	No burning after 30 s			
4.24	78 (Cab)	Damp heat, steady state	(40 ± 2) $^{\circ}\text{C}$; (93 ± 3) % RH; 56 days	$\pm (1 \% R + 0.05 \Omega)$			
4.25.3	-	Endurance at upper category temperature	155 $^{\circ}\text{C}$, 1000 h	$\pm (1 \% R + 0.05 \Omega)$	$\pm (2 \% R + 0.1 \Omega)$		
4.40	-	Electrostatic discharge (human body model)	IEC 61340-3-1; 3 pos. + 3 neg. discharges; ESD voltage acc. to size	$\pm (1 \% R + 0.05 \Omega)$			
4.29	45 (XA)	Component solvent resistance	Isopropyl alcohol; 50 $^{\circ}\text{C}$; method 2	No visible damage			
4.30	45 (XA)	Solvent resistance of marking	Isopropyl alcohol; 50 $^{\circ}\text{C}$; method 1, toothbrush	Marking legible, no visible damage			
4.22	6 (Fc)	Vibration, endurance by sweeping	$f = 10 \text{ Hz to } 2000 \text{ Hz}$; $x, y, z \leq 1.5 \text{ mm}$; $A \leq 200 \text{ m/s}^2$; 10 sweeps per axis	$\pm (0.25 \% R + 0.05 \Omega)$	$\pm (0.5 \% R + 0.05 \Omega)$		
4.37	-	Periodic electric overload	$U = \sqrt{15 \times P_{70} \times R}$ $\leq 2 \times U_{\text{max.}}$; 0.1 s on; 2.5 s off; 1000 cycles	$\pm (1 \% R + 0.05 \Omega)$			
4.27	-	Single pulse high voltage overload, 10 μs /700 μs	$\hat{U} = 10 \times \sqrt{P_{70} \times R}$ $\leq 2 \times U_{\text{max.}}$; 10 pulses	$\pm (1 \% R + 0.05 \Omega)$			

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-x, environmental test procedures

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

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