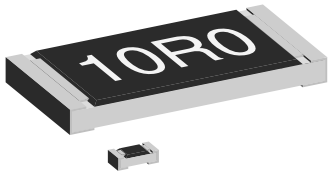
Lead (Pb)-bearing Thick Film, Rectangular Chip Resistors



FEATURES

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

STANDARD 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	0402	1005	0.063	50	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
			Zero-Ohm-Resistor: $R_{max.}$ = 20 mΩ, $I_{max.}$ 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: $R_{max.}$ = 20 mΩ, $I_{max.}$ 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: $R_{max.}$ = 20 mΩ, $I_{max.}$ 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: $R_{max.}$ = 20 mΩ, $I_{max.}$ at 70 °C = 3.5 A					
CRCW1210	1210	3225	0.33	200	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
			Zero-Ohm-Resistor: $R_{max.}$ = 20 mΩ, $I_{max.}$ at 70 °C = 4.0 A					
CRCW1218	1218	3246	1.0	200	± 100 ± 200	± 1 ± 5	1R0 - 2M2	24 + 96 24
			Zero-Ohm-Resistor: $R_{max.}$ = 20 mΩ, $I_{max.}$ at 70 °C = 7.0 A					
CRCW2010	2010	5025	0.50	400	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
			Zero-Ohm-Resistor: $R_{max.}$ = 20 mΩ, $I_{max.}$ at 70 °C = 5.0 A					
CRCW2512	2512	6332	1.0	500	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
			Zero-Ohm-Resistor: $R_{max.}$ = 20 mΩ, $I_{max.}$ 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

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}	0.3×10^{-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: $\sqrt{P \times R}$

(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.

PART NUMBER AND PRODUCT DESCRIPTION

PART NUMBER: CRCW0805562RFKTA (4)

C	R	C	W	0	8	0	5	5	6	2	R	F	K	T	A		

MODEL	VALUE	TOLERANCE	TCR	PACKAGING (5)	SPECIAL
CRCW0402 **CRCW0603** **CRCW0805** **CRCW1206** **CRCW1210** **CRCW1218** **CRCW2010** **CRCW2512**	**R** = Decimal **K** = Thousand **M** = Million **0000** = Jumper	**F** = ± 1 % **J** = ± 5 % **Z** = Zero Ohm Jumper	**K** = ± 100 ppm/K **N** = ± 200 ppm/K **S** = Jumper or special	**TA** **TB** **TC** **TD** **TE** **TF** **TG** **TH** **TI** **TK** **TL** **BA**	Up to 2 digits

PRODUCT DESCRIPTION: CRCW 0805 5620 F 100 RT1

CRCW	0805	5620	F	100	RT1
MODEL	SIZE	RESISTANCE VALUE	TOLERANCE	TCR	PACKAGING (5)
CRCW	0402 1201 0603 1218 0805 2010 1206 2512	685 = 6.8 MΩ 224 = 220 kΩ ± 1 % = 3 sig.digits, plus multiplier ± 5 % = 2 sig.digits, plus multiplier	F = ± 1 % J = ± 5 % Z = Zero Ohm Jumper	± 100 ppm/K ± 200 ppm/K	RT1 RT5 RT6 RT7 RT4 R02 R67 R82 RG1 RT9 R20 B27

Notes

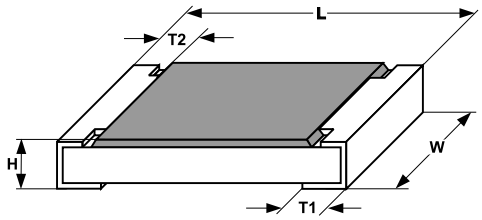
(4) Preferred way for ordering products is by use of the PART NUMBER

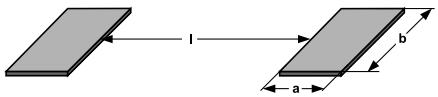
(5) Please refer to table PACKAGING, see next page

PACKAGING

MODEL	REEL								BULK		
	TAPE WIDTH	DIAMETER	PITCH	PIECES/ REEL	PACKAGING CODE				PIECES	PACKAGING CODE	
					PART NUMBER		PRODUCT DESC.			PART NUMBER	PRODUCT DESC.
					PAPER	BLISTER	PAPER	BLISTER			
D10/CRCW0402	8 mm	180 mm/7"	2 mm	10 000	TD		RT7		50 000	BA	B27
		330 mm/13"	2 mm	50 000	TE		RF4				
D11/CRCW0603	8 mm	180 mm/7"	4 mm	5000	TA	TI	RT1	RG1	25 000	BA	B27
		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	10 000	BA	B27
		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	15 000		TL		R20			
		330 mm/13"	4 mm	20 000	TC		RT6				
CRCW1210	12 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

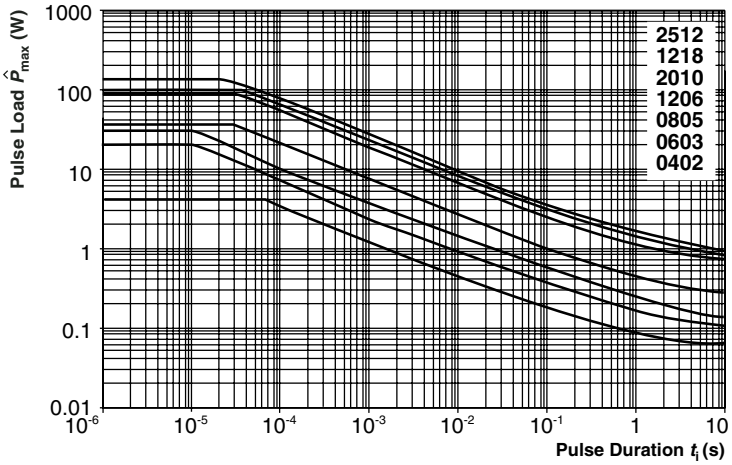




SIZE		DIMENSIONS [in millimeters]					SOLDER PAD DIMENSIONS [in millimeters]					
							REFLOW SOLDERING			WAVE SOLDERING		
INCH	METRIC	L	W	H	T1	T2	a	b	l	a	b	l
0402	1005	1.0 ± 0.05	0.5 ± 0.05	0.35 ± 0.05	0.25 ± 0.05	0.2 ± 0.1	0.4	0.6	0.5			
0603	1608	1.55 $^{+0.10}_{-0.05}$	0.85 ± 0.1	0.45 ± 0.05	0.3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

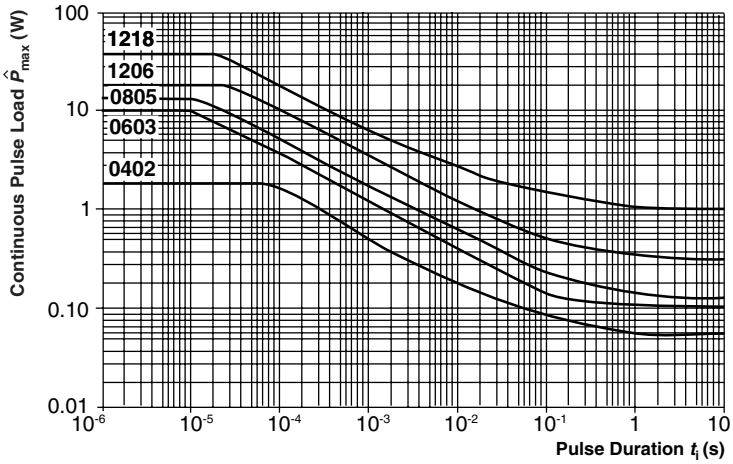
FUNCTIONAL PERFORMANCE

Single Pulse



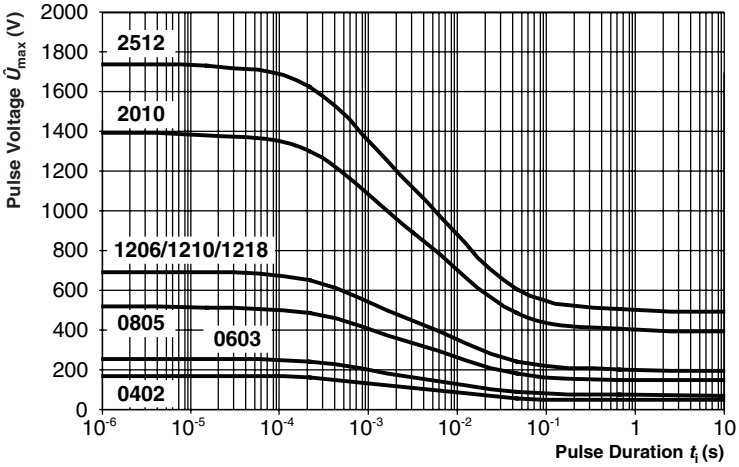
Maximum pulse load, single pulse; applicable if $\bar{P} \rightarrow 0$ and $n \leq 1000$ and $\hat{U} \leq \hat{U}_{max}$; for permissible resistance change equivalent to 8000 h operation

Continuous Pulse

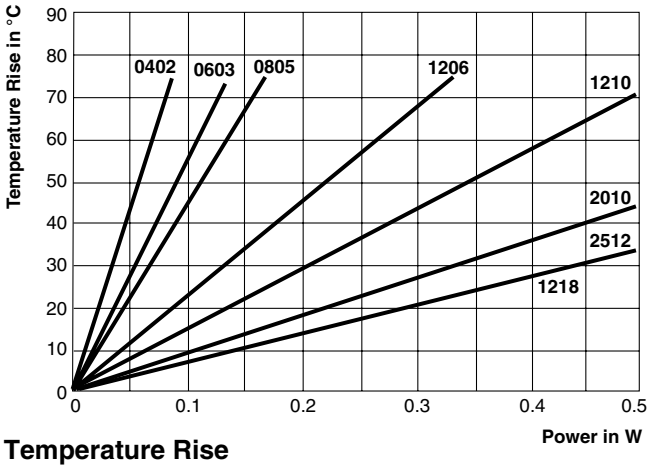


Maximum pulse load, continuous pulses; applicable if $\bar{P} \leq P(\vartheta_{amb})$ and $\hat{U} \leq \hat{U}_{max}$; for permissible resistance change equivalent to 8000 h operation

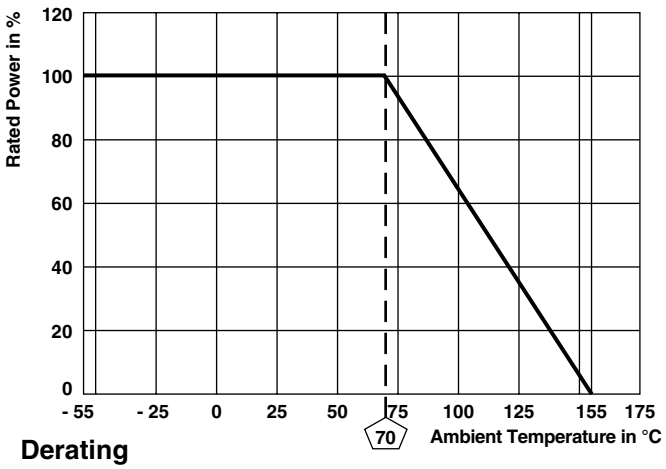
Pulse Voltage



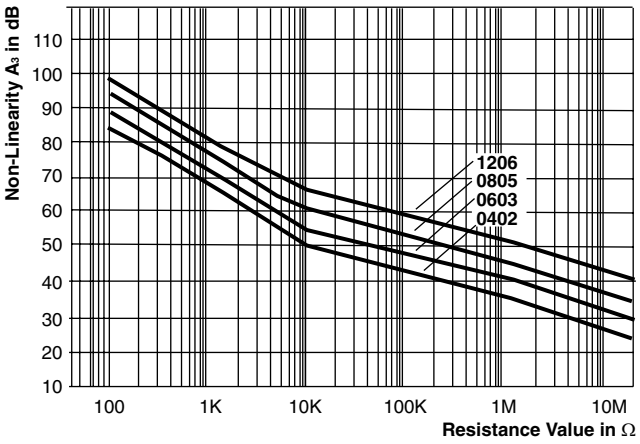
Maximum pulse voltage, single and continuous pulses; applicable if $\hat{P} \leq \hat{P}_{max}$; for permissible resistance change equivalent to 8000 h operation



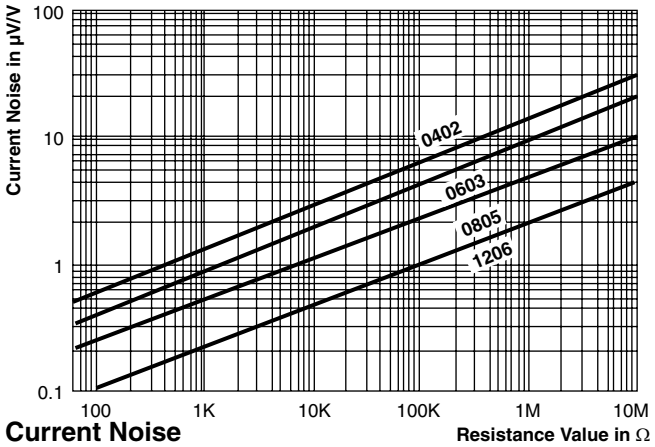
Temperature Rise



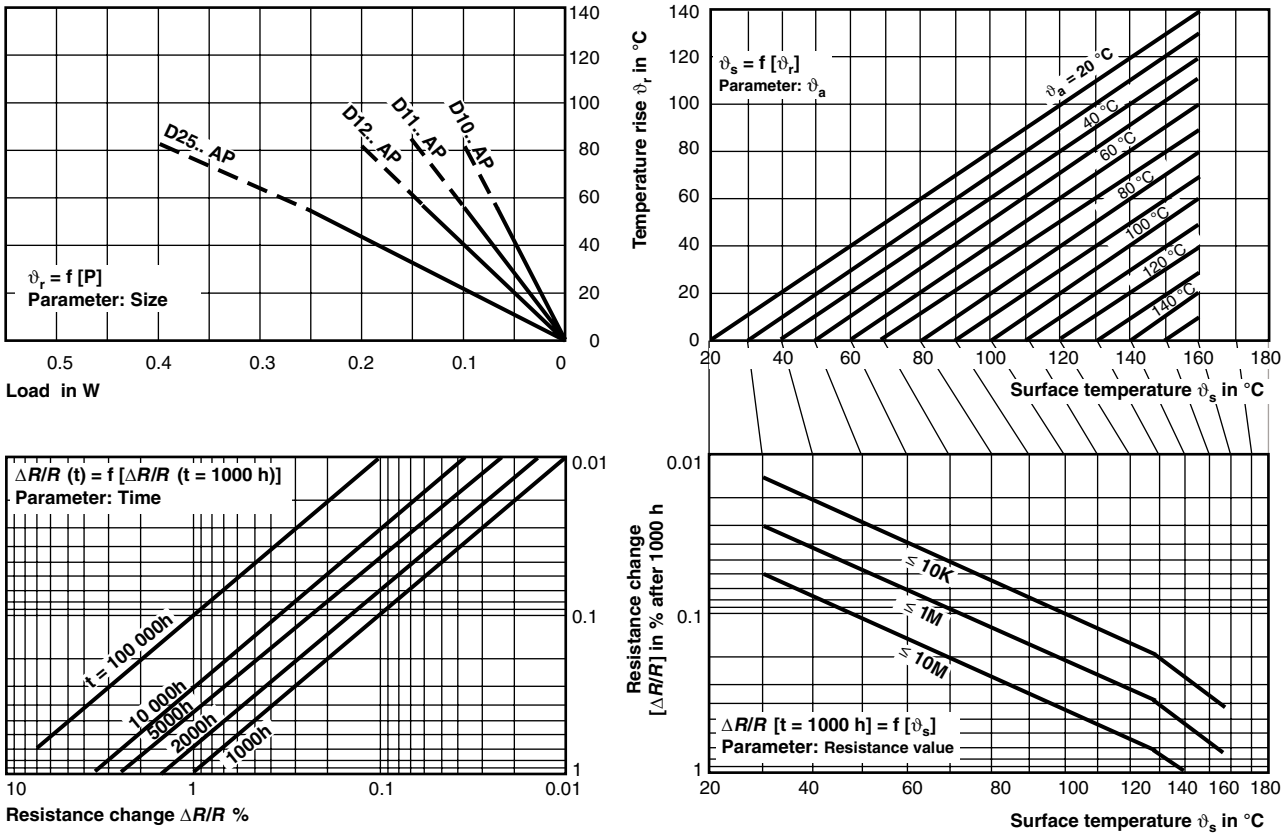
Derating



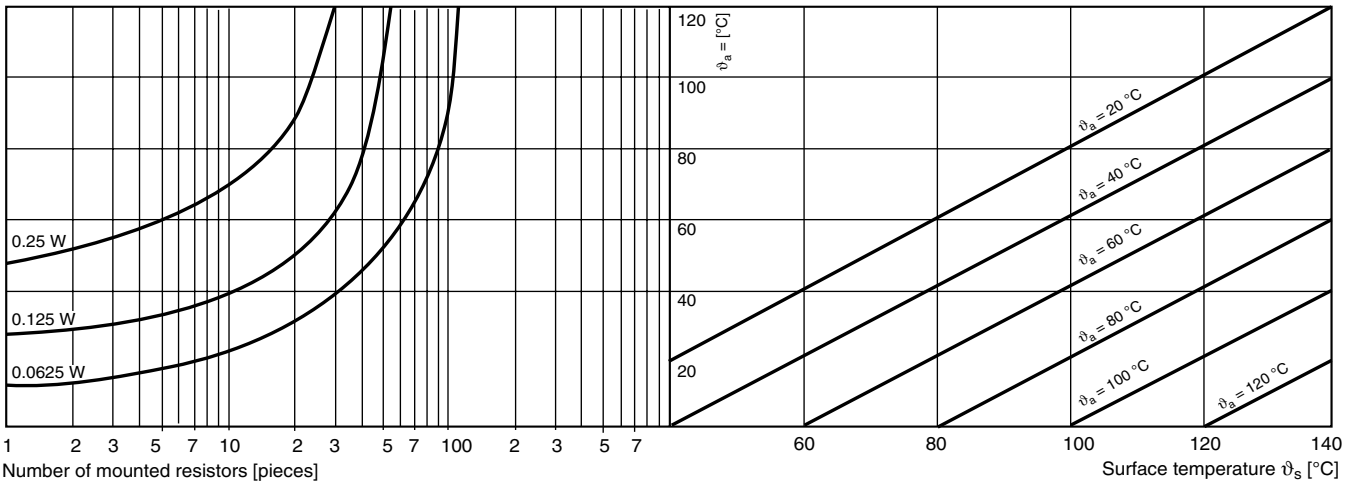
Non-Linearity



Current Noise



Stability nomogram typical values (for handling see general explanations)



Power rating as a function of packaging density (guideline)

TEST PROCEDURES AND REQUIREMENTS

EN 60115-1			
TEST (clause)	**CONDITIONS OF TEST**	**REQUIREMENTS**	
		STABILITY CLASS 1 OR BETTER	**STABILITY CLASS 2 OR BETTER**
	Stability for product types: **D../CRCW...**	1 Ω to 10 MΩ	1 Ω to 10 MΩ
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)	$U = 2.5 \times (P_{70} \times R)^{1/2}$ ≤ 2 x $U_{max.}$; 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)

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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