

Data Sheet

Customer :

Product : Professional Thin Film Chip Resistors – ART Series

Size: 0603

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**Professional Thin Film Chip Resistors
(ART Series)**

■ Features

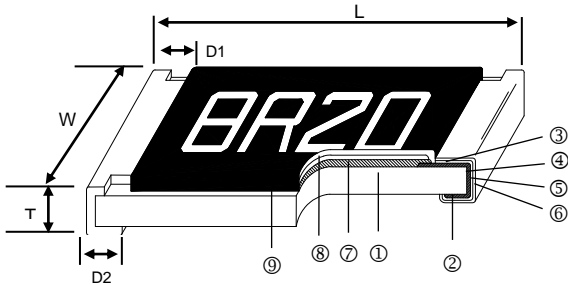
- Operating temperature up to 175°C for 1000 hr
- AEC-Q200 Compliance
- Superior temperature cycling robustness
- Advanced sulfur resistance verified according to ASTM B 809

■ Applications

- Automotive
- Telecommunication
- Medical equipment
- Industrial equipment



■ Construction



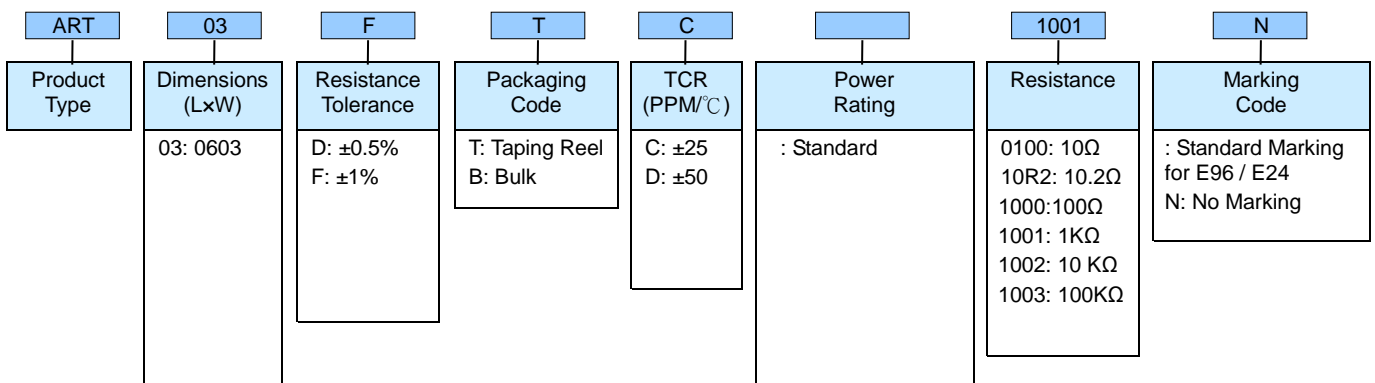
① Alumina Substrate	④ Edge Electrode	⑦ Resistor Layer
② Bottom Electrode	⑤ Barrier Layer	⑧ Overcoat
③ Top Electrode	⑥ External Electrode	⑨ Marking

■ Dimensions

Unit: mm

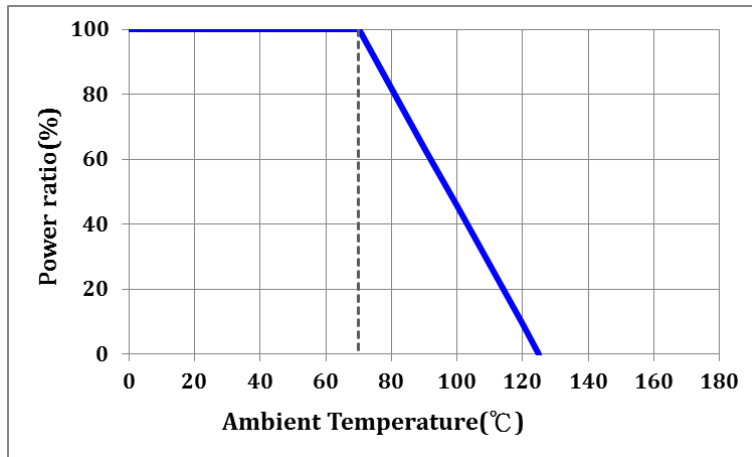
Type	Size (Inch)	L	W	T	D1	D2	Weight (g) (1000pcs)
ART03	0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20	1.83

■ Part Numbering

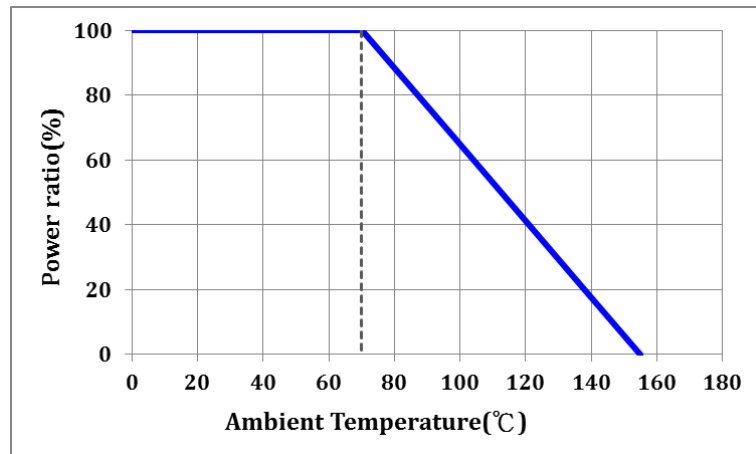


■ Functional Performance

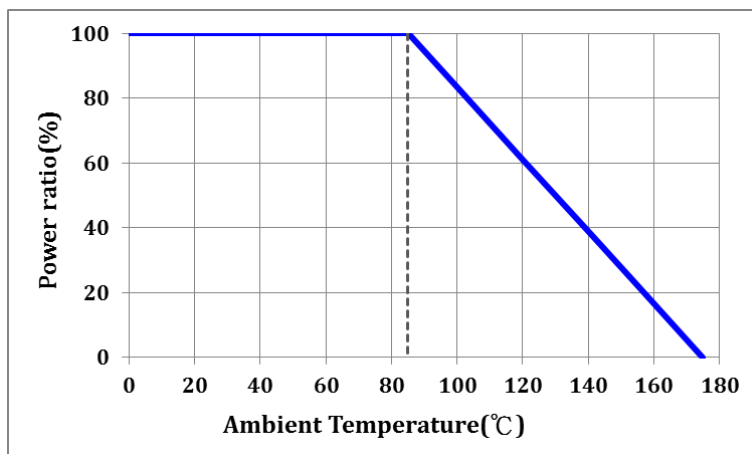
Derating-Standard Operation



Derating- Power Operation

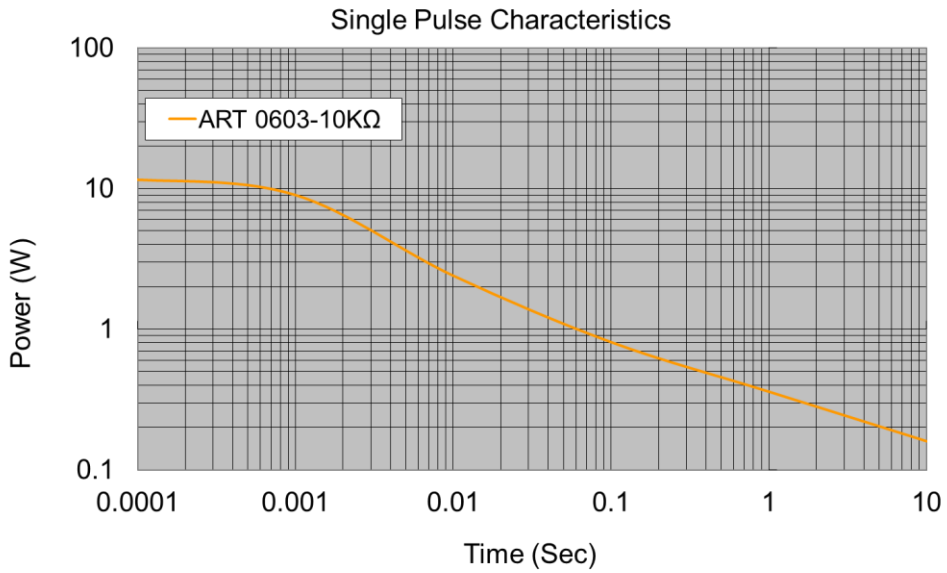


Derating- Advanced Power Operation

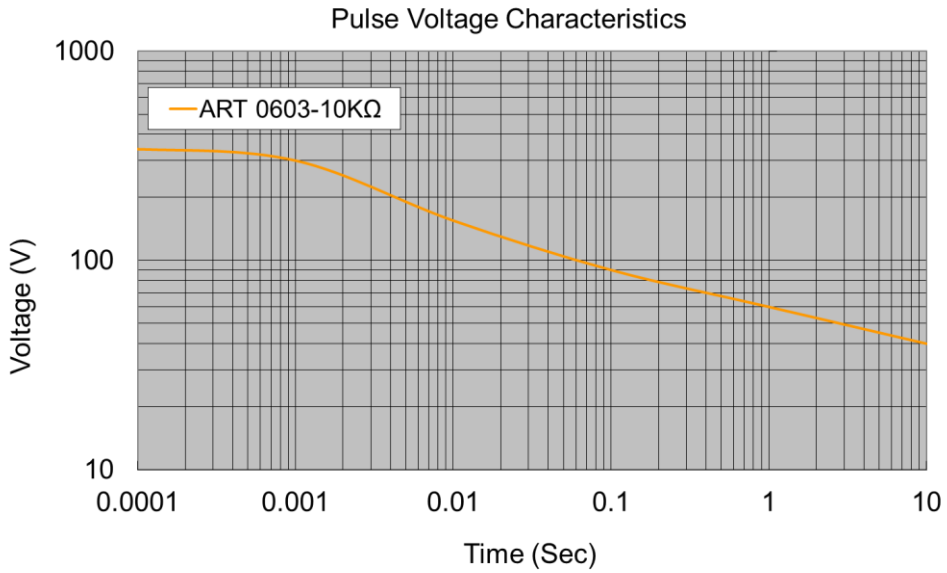


■ Functional Performance

Single pulse



Pulse Voltage



■ Standard Electrical Specifications

Type	Item	Power Rating at 85°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range		TCR (PPM/°C)
						±0.5%	±1%	
ART03	3/20W	-55 ~ +175°C	75V	150V	10Ω – 511KΩ		±25	
					1Ω – 511KΩ		±50	

■ Maximum Resistance Change at Rated Dissipation

Operation Mode			Standard P ₇₀	Power P ₇₀	Advanced Temperature P ₈₅
ART03	Power Rating		1/10W	1/8W	3/20W
	Operating temperature range		-55 ~ +125°C	-55 ~ +155°C	-55 ~ +175°C
	Permissible film temperature		+125°C	+155°C	+175°C
	Max. resistance change at rated dissipation for resistance range, ΔR/R after:	Resistance range	1Ω – 511KΩ	1Ω – 511KΩ	1Ω – 511KΩ
		1000hr	≤ 0.15%	≤ 0.3%	≤ 0.5%
	8000hr	≤ 0.25%	≤ 0.5%	—	

Operating Voltage= $\sqrt{P \cdot R}$ or Max. operating voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$ or Max. overload voltage listed above, whichever is lower.

■ Viking is capable of manufacturing the optional spec based on customer's requirement.

Environmental Characteristics

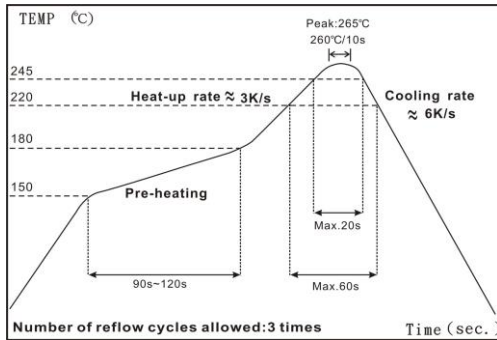
Item	Requirement		Test Method	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		MIL-STD-202 Method 304 +25/-55/+25/+125/+25°C	
Short Time Overload (Standard operation mode)	$\Delta R \pm 0.10\%$		JIS-C-5201-1 4.13 RCWV*2.5 or Max. overload voltage whichever is lower for 5 seconds	
Short Time Overload (Power operation mode)	$\Delta R \pm 0.25\%$			
Insulation Resistance	>1000 M Ω		MIL-STD-202 Method 302 Apply 100V _{DC} for 1 minute	
Endurance	Standard at 70°C	1000hrs	$\Delta R \pm 0.15\%$	MIL-STD-202 Method 108 RCWV with 1.5 hrs "ON" and 0.5 hrs "OFF"
		8000hrs	$\Delta R \pm 0.25\%$	
	Power at 70°C	1000hrs	$\Delta R \pm 0.30\%$	
		8000hrs	$\Delta R \pm 0.50\%$	
Advanced temperature at 85°C	1000hrs	$\Delta R \pm 0.50\%$		
High Temperature Exposure	125°C	$\Delta R \pm 0.15\%$	MIL-STD-202 Method 108 1000 hrs	
	155°C	$\Delta R \pm 0.30\%$		
	175°C	$\Delta R \pm 0.50\%$		
Damp Heat with Load	$\Delta R \pm 0.1\%$		MIL-STD-202 Method 103 40±2°C, 90~95% R.H. RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"	
Biased Humidity	$\Delta R \pm 0.5\%$		MIL-STD-202 Method 103 1000 hrs 85°C/85%RH 10% of operating power	
Temperature Cycling	$\Delta R \pm 0.25\%$		JESD22 Method JA-104 -55°C to +155°C, 1000 cycles	
Bending Strength (Board Flex)	$\Delta R \pm 0.1\%$		JIS-C-5201-1 4.33 Bending once for 60 seconds Bending displacement: 0603 sizes: 3 mm	
Solderability	95% min. coverage		JIS-C-5201-1 4.17 IEC-60115-1 4.17 245±5°C for 3 seconds	
Resistance to Soldering Heat	$\Delta R \pm 0.1\%$		JIS-C-5201-1 4.18 IEC-60115-1 4.18 260±5°C for 10 seconds	
Terminal strength	No broken		AEC-Q200-006 Force of 1.8kg for 60 seconds.	
Mechanical Shock	$\Delta R \pm 0.1\%$		MIL-STD-202 Method 213 Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.	
Vibration	$\Delta R \pm 0.1\%$		MIL-STD-202 Method 204 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz	
ESD	$\Delta R \pm 0.5\%$		AEC-Q200-002 Human body model 0603 0.5KV	

Resistance to solvents	Marking Unsmearred	MIL-STD-202 Method 215 Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Flammability	No ignition of the tissue paper or scorching or the pinewood board	UL-94 V-0 or V-1 are acceptable. Electrical test not required.

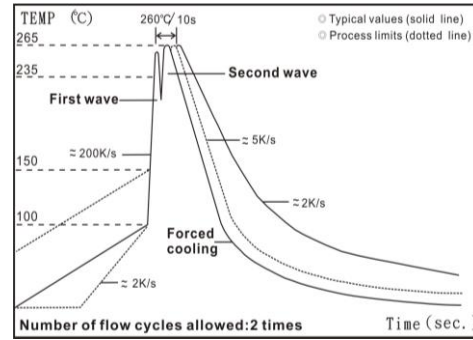
RCWV(Rated continuous working voltage)= $\sqrt{P \cdot R}$ or Max. Operating voltage whichever is lower

■ Storage Temperature: 15~28°C; Humidity < 80%RH

■ Soldering Condition



IR Reflow Soldering



Wave Soldering (Flow Soldering)

- (1) Time of IR reflow soldering at maximum temperature point 260°C : 10s
- (2) Time of wave soldering at maximum temperature point 260°C : 10s
- (3) Time of soldering iron at maximum temperature point 410°C : 5s

■ Marking

0603 3digit marking



3digit marking for Example: 14C=13K7Ω 13C=13K3Ω
68B=4K99Ω 68X=49.9Ω

Marking Table

Code	E96	Code	E96	Code	E96	Code	E96				
01	100	25	178	49	316	73	562				
02	102	26	182	50	324	74	576				
03	105	27	187	51	332	75	590				
04	107	28	191	52	340	76	604				
05	110	29	196	53	348	77	619				
06	113	30	200	54	357	78	634				
07	115	31	205	55	365	79	649				
08	118	32	210	56	374	80	665				
09	121	33	215	57	383	81	681				
10	124	34	221	58	392	82	698				
11	127	35	226	59	402	83	715				
12	130	36	232	60	412	84	732				
13	133	37	237	61	422	85	750				
14	137	38	243	62	432	86	768				
15	140	39	249	63	442	87	787				
16	143	40	255	64	453	88	806				
17	147	41	261	65	464	89	825				
18	150	42	267	66	475	90	845				
19	154	43	274	67	487	91	866				
20	158	44	280	68	499	92	887				
21	162	45	287	69	511	93	909				
22	165	46	294	70	523	94	931				
23	169	47	301	71	536	95	953				
24	174	48	309	72	549	96	976				
Code	A	B	C	D	E	F	G	H	X	Y	Z
Multiplier	10 ⁰	10 ¹	10 ²	10 ³	10 ⁴	10 ⁵	10 ⁶	10 ⁷	10 ⁻¹	10 ⁻²	10 ⁻³

0603 3digit marking for E24

Example: 101=100Ω 102=1KΩ

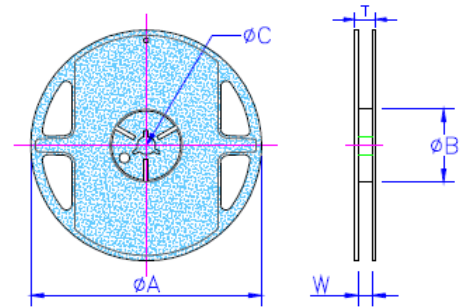
E24	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47	51	56	62	68	75	82	91
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■Packaging

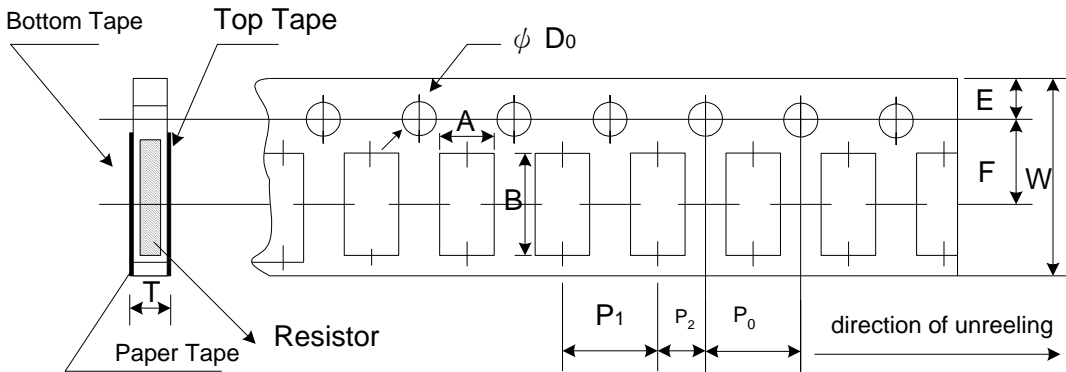
Packing Quantity & Reel Specifications

Unit : mm

Type	ØA	ØB	ØC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
ART0603	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-



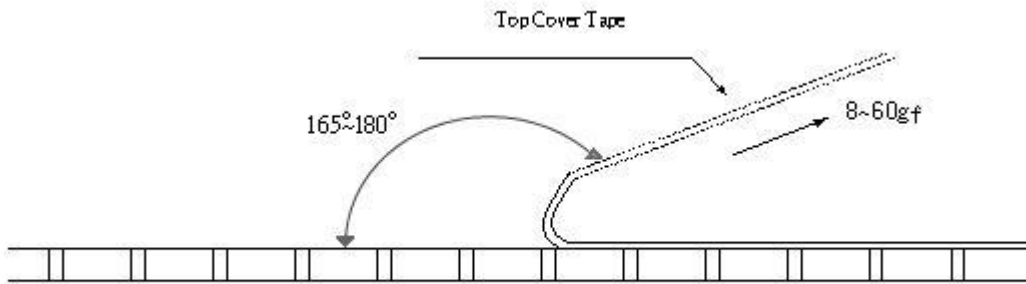
Paper Tape Specifications



Unit: mm

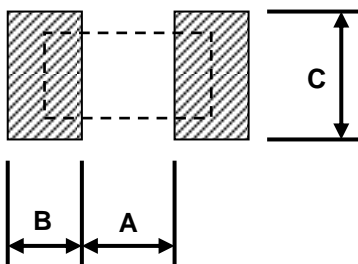
Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
ART03	1.10±0.05	1.90±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.60±0.03

- Peel force of top cover tape
- The peel speed shall be about 300mm/min±5%
- The peel force of top cover tape shall be between 8gf to 60gf



■Recommend Land Pattern

Unit: mm



Type	A	B	C
ART03	0.80	1.00	0.90±0.2