

Data Sheet

Customer :

Product :	Automotive Grade Professional Thin Film Chip Resistor– ART..A Series
Size:	0402/0603/0805/1206
Issued Date:	20-May-25
Edition :	REV.A3



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20-May-25	20-May-25	20-May-25		
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Automotive Grade Professional Thin Film Chip Resistor (ART..A Series)



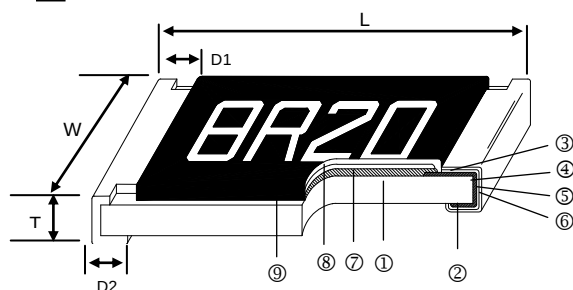
■ Features

- Operating temperature up to 175℃ for 1000 h
- Rated dissipation P_{85} up to 0.4W for size 1206
- AEC-Q200 Qualified
- 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)
ART02	0402	1.00±0.05	0.50±0.05	0.30±0.05	0.20±0.10	0.20±0.10	0.54
ART03	0603	1.55±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20	1.83
ART05	0805	2.00±0.15	1.25±0.15	0.55±0.10	0.30±0.20	0.40±0.20	4.71
ART06	1206	3.05±0.15	1.55±0.15	0.55±0.10	0.42±0.20	0.35±0.25	9.02

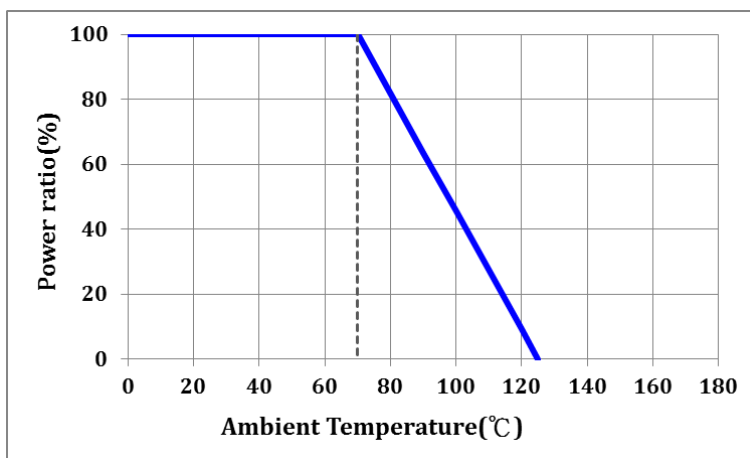
■ Part Numbering

ART	03	B	T	C		1001	A
Product Type	Dimensions (L×W)	Resistance Tolerance	Packaging Code	TCR (PPM/℃)	Power Rating	Resistance	Marking Code
	02: 0402 03: 0603 05: 0805 06: 1206	B: ±0.1% D: ±0.5% F: ±1%	T: Taping Reel B: Bulk	C: ±25 D: ±50	: Standard* (See Remark)	0100: 10Ω 10R2: 10.2Ω 1000: 100Ω 1001: 1KΩ 1002: 10 KΩ 1003: 100KΩ 1004: 1M Ω	A: Automotive Grade NA: No Marking Automotive Grade

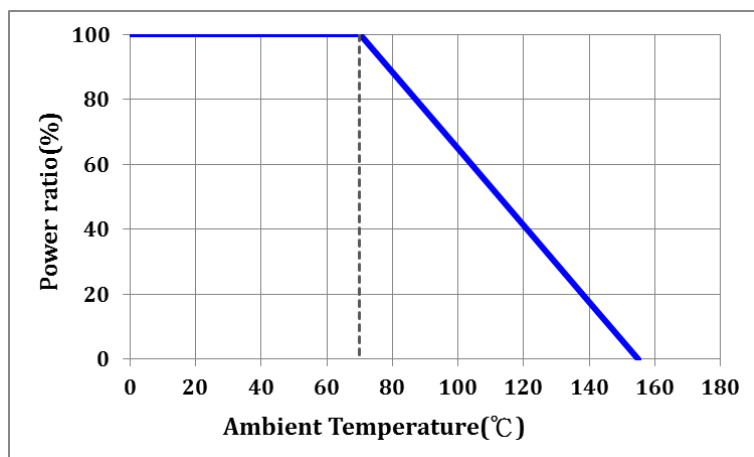
*Remark: Standard part no need for power rating code.

■ Functional Performance

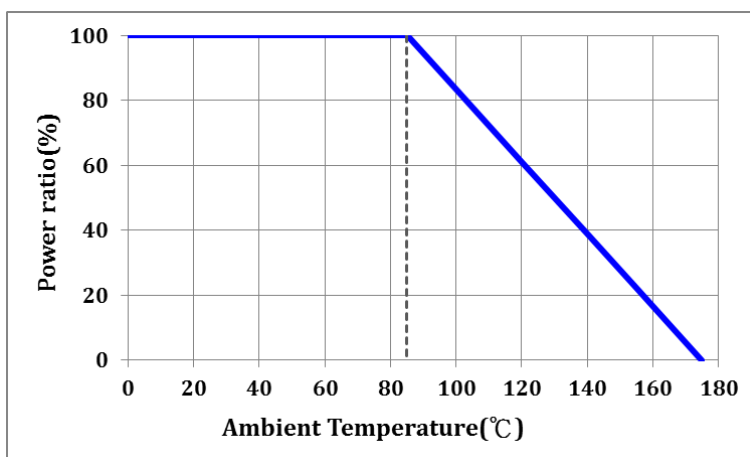
Derating-Standard Operation



Derating- Power Operation

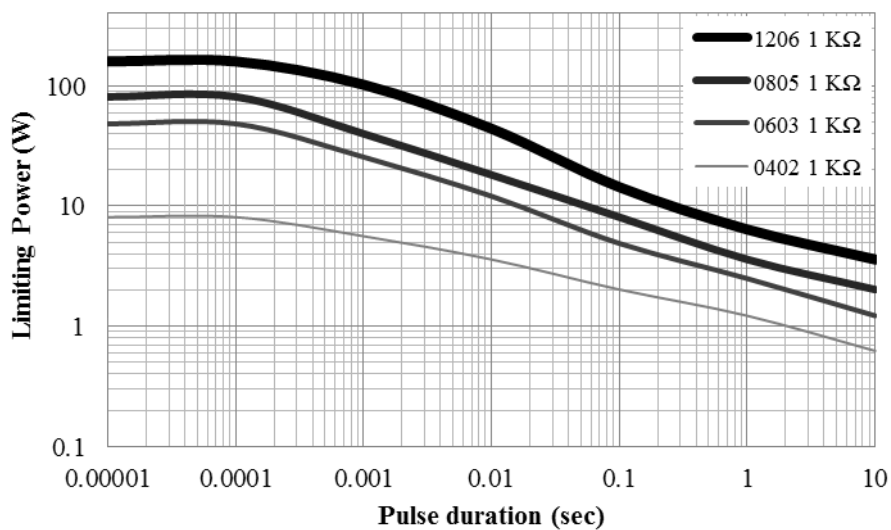


Derating- Advanced Power Operation

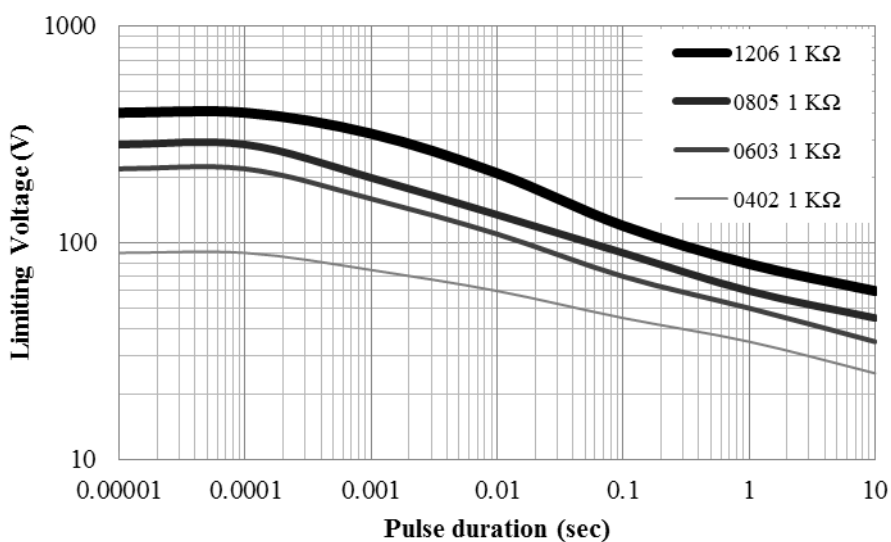


■ Functional Performance

Single pulse



Pulse Voltage



■ Standard Electrical Specifications

Item Type	Power Rating at 85℃	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range			TCR (PPM/℃)
					±0.1%	±0.5%	±1%	
ART02	0.13W	-55 ~ +175℃	50V	100V	49.9Ω – 221KΩ			±25,±50
ART03	0.21W	-55 ~ +175℃	75V	150V	10Ω – 511KΩ			±25,±50
ART05	0.26W	-55 ~ +175℃	150V	300V	10Ω – 1MΩ			±25,±50
ART06	0.52W	-55 ~ +175℃	200V	400V	10Ω – 1MΩ			±25,±50

■ Maximum Resistance Change at Rated Dissipation

Operation Mode		Standard P ₇₀	Power P ₇₀	Advanced Temperature P ₈₅
Rated dissipation	ART02	0.070W	0.105W	0.130W
	ART03	0.110W	0.170W	0.210W
	ART05	0.140W	0.220W	0.260W
	ART06	0.270W	0.420W	0.520W
Operating temperature range		-55 ~ 125℃	-55 ~ 155℃	-55 ~ 175℃
Permissible film temperature		125℃	155℃	175℃
Max. resistance change at rated dissipation for resistance range, ΔR/R after:	ART02	49.9Ω – 221KΩ	49.9Ω – 221KΩ	49.9Ω – 221KΩ
	ART03	10Ω – 511KΩ	10Ω – 511KΩ	10Ω – 511KΩ
	ART05	10Ω – 1MΩ	10Ω – 1MΩ	10Ω – 1MΩ
	ART06	10Ω – 1MΩ	10Ω – 1MΩ	10Ω – 1MΩ
	1000hr	≤ 0.15%	≤ 0.3%	≤ 0.5%
	8000hr	≤ 0.25%	≤ 0.5%	—

Operating Voltage=√(P*R) or Max. operating voltage listed above, whichever is lower.

Overload Voltage=2.5*√(P*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)	ΔR±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)	ΔR±0.25%			
Insulation Resistance	>1000 MΩ			MIL-STD-202 Method 302 Apply 100V _{DC} for 1 minute
Endurance	Standard at 70°C	1000hrs	ΔR±0.15%	MIL-STD-202 Method 108 RCWV with 1.5 hrs “ON” and 0.5 hrs “OFF”
		8000hrs	ΔR±0.25%	
	Power at 70°C	1000hrs	ΔR±0.3%	
		8000hrs	ΔR±0.5%	
	Advanced temperature at 85°C	1000hrs	ΔR±0.5%	
High Temperature Exposure	125°C	ΔR±0.15%		EN 60115-1 CLAUSE 4.25.3 1000 hrs
	155°C	ΔR±0.3%		
	175°C	ΔR±0.5%		
Temperature Cycling	ΔR±0.25%			JESD22 Method JA-104 30 min at -55 °C and 30 min at 155 °C; , 1000 cycles
Biased Humidity	Standard operation mode ΔR±0.5%			MIL-STD-202 Method 103 1000hrs 85°C/85%RH 10% of operating power (≤ 100 V)
Bending Strength (Board Flex)	ΔR±0.1%			JIS-C-5201-1 4.33 Bending once for 60 seconds Bending displacement: 0402 0603 0805 1206 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	ΔR±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 0402 0603: Force of 1kg for 60 seconds. Others: Force of 1.8kg for 60 seconds.
Mechanical Shock	ΔR±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	ΔR±0.1%			MIL-STD-202 Method 204 5 g’s for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	ΔR±0.5%			AEC-Q200-002 Human body model AR02 0.4KV AR03 1KV AR05 1.5KV AR06 2KV
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.
External Visual	No visible damage.			MIL-STD-883 Method 2009 Electrical test not required. Inspect device construction, marking and workmanship.

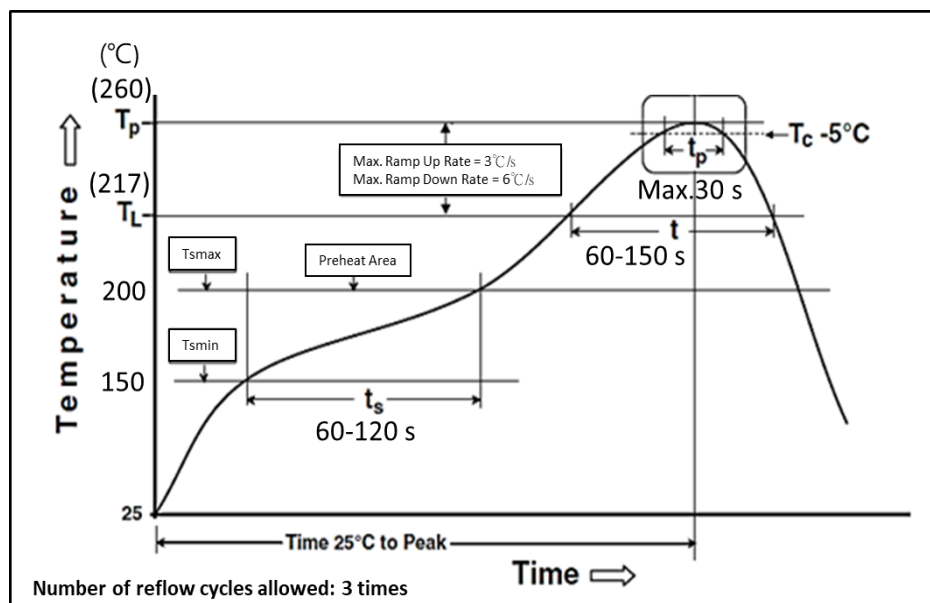
Physical Dimension	As Spec.	JESD22 Method JB-100 Verify physical dimensions to the applicable device detail specification. Note: User(s) and Suppliers Specification. Electrical test not required.
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RCWV(Rated continuous working voltage)= $\sqrt{P \cdot R}$ or Max. Operating voltage whichever is lower

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

■ Shelf Life: 2 years from production date.

■ Soldering Condition(IPC/JEDEC J-STD-020)



Reflow Profiles	
Profile Feature	Pb-Free Assembly
Preheat	
Min. Temperature (T _{min})	150 °C
Max Temperature (T _{max})	200 °C
Preheating time (t _s) from (T _{min} to T _{max})	60-120 seconds
Ramp-up rate (T _L to T _p)	3 °C/second max.
Liquidous temperature (T _L)	217 °C
Time (t _L) maintained above T _L	60-150 seconds
Min. Peak temperature (T _p min)	235°C
Max. Peak temperature (T _p max)	260°C
Time (t _p) within 5 °C of the specified classification temperature (T _c)	30 seconds max.
Ramp-down rate (T _p to T _L)	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

■ Marking

0603 3digit marking



3digit marking for Example: 14C=13K7Ω 13C=13K3Ω

68B=4K99Ω 68X=49.9Ω

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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0805~1206 4digit marking

Example

Resistance	100Ω	2.2KΩ	10KΩ	49.9KΩ	100KΩ
marking	1000	2201	1002	4992	1003

Marking Table

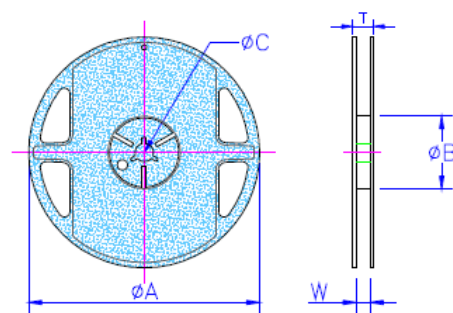
Code	E96		Code	E96		Code	E96		Code	E96	
01	100		25	178		49	316		73	562	
02	102		26	182		50	324		74	576	
03	105		27	187		51	332		75	590	
04	107		28	191		52	340		76	604	
05	110		29	196		53	348		77	619	
06	113		30	200		54	357		78	634	
07	115		31	205		55	365		79	649	
08	118		32	210		56	374		80	665	
09	121		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

Packaging

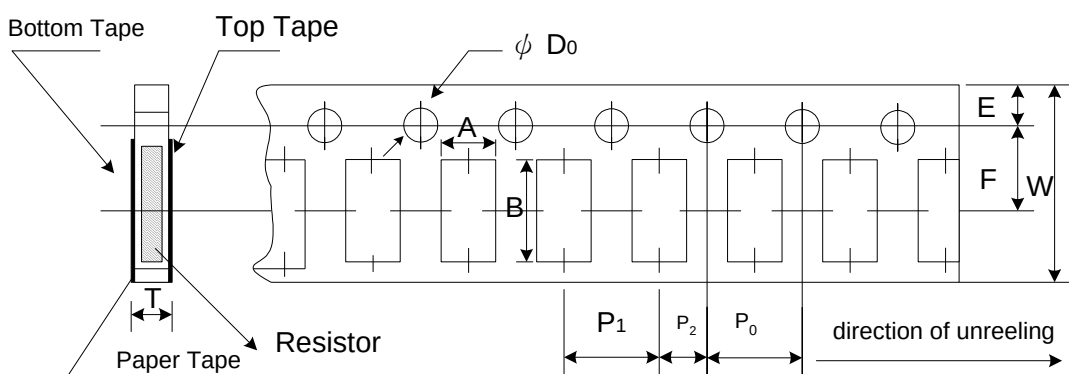
Packing Quantity & Reel Specifications

Unit : mm

Type	ØA	ØB	ØC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
ART02	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
ART03	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ART05	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ART06	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-



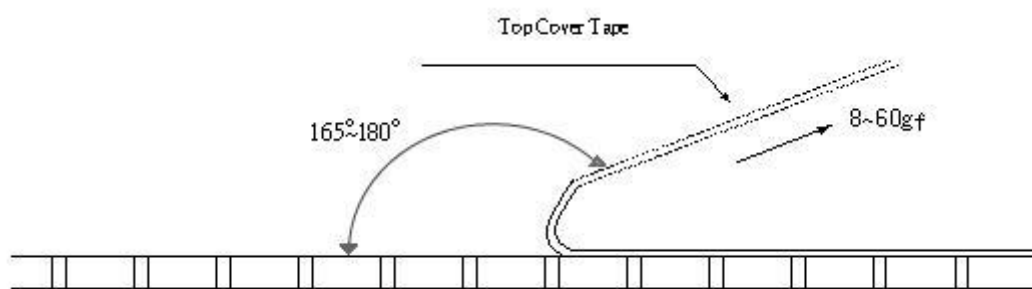
Paper Tape Specifications



Unit: mm

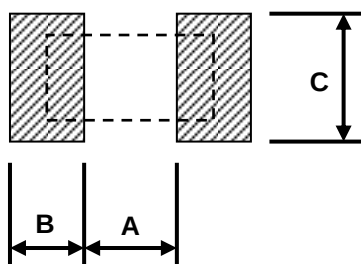
Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
ART02	0.70±0.05	1.16±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.55±0.05	0.40±0.03
ART03	1.10±0.05	1.90±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.60±0.03
ART05	1.60±0.05	2.37±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
ART06	2.00±0.05	3.55±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.10	1.55±0.05	0.75±0.05

- 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
ART02	0.50	0.50	0.60±0.2
ART03	0.80	1.00	0.90±0.2
ART05	1.00	1.00	1.35±0.2
ART06	2.00	1.15	1.70±0.2

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version A	Apr 25,2022	-	- Correct the scheme.
Version A1	May 16,2024	-	- Modify the test conditions of reliability items, Temperature Cycling and ESD
Version A2	Jul 01,2024	-	- Modify the description in Features from "AEC-Q200 Compliance" to "AEC-Q200 Qualified"
Version A3	May 20,2025	-	-Increase the product power rating