FA Series

Automotive Grade Convex Termination Anti-Sulfur Thick Film Chip Array Resistors

Version. E

FEATURE

- AEC-Q200 qualified.
- High stability and reliability
- RoHS and Halogen-free compliance
- Centralized packaging to improve assembly efficiency
- Superior anti-sulfur performance
- MSL class: MSL 1
- Compatible with reflow and wave soldering type
- Applications:
  - Automotive electronics
  - Computer, laptop, workstation, tablet, and peripherals
  - Hard disk, DRAM
  - TV motherboard, Monitor board
  - Lighting
  - etc.

MANUFACTURER PART NO.

For example: FA0204J100KT5A00 - FA0204 ±5% 100KΩ T/R-10000

Series	Size	Tol.	Nominal Resistance Value	PKG	SPQ	Feature	TCR
2 codes	4 codes	1 code	2~5 codes	1 code	1 code	1 code	2 codes
FA	0204	J	100K	T	A	G	00
FA: Automotive Grade Convex Termination Anti-Sulfur Thick Film Chip Array Resistors	0202=0402×2 0204=0402×4 0302=0603×2 0304=0603×4	F=±1% J=±5%	1R①=1Ω 4R7=4.7Ω 4K7②=4.7KΩ 100K=100KΩ 1M③=1MΩ	T=T/R④	5=5K A=10K	G=Std. S=P.C.⑤	00=Refer to table as below.

Note: ① R=Radix, 10^0, Ω ② K=Kilo, 10^3, KΩ ③ M=Mega, 10^6, MΩ
④ T/R=Taping in Reel packing type ⑤ P.C.=Personal and Customized.

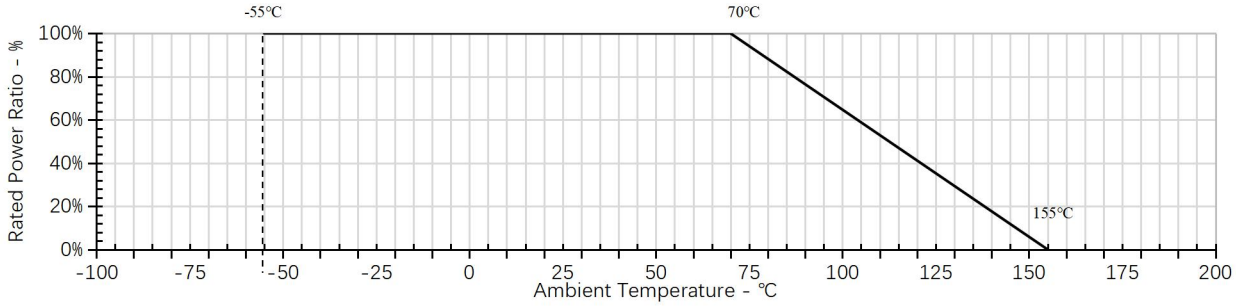
CHARACTERISTICS

Type	Size	Rated Power	MWV①	MOV②	Tolerance	Value Range
FA0202	0402*2	1/16W	50V	100V	±1%, ±5%	10Ω-1MΩ
FA0204	0402*4	1/16W	50V	100V	±1%, ±5%	10Ω-1MΩ
FA0302	0603*2	1/16W	50V	100V	±1%, ±5%	10Ω-1MΩ
FA0304	0603*4	1/16W	50V	100V	±1%, ±5%	1Ω-1MΩ

Note: ① MWV=Max. Working Voltage ② MOV=Max. Overload Voltage

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POWER DERATING CURVE



Note: Operating Temperature Range: -55℃~+155℃

RATED VOLTAGE

Resistors should have a Rated Voltage DC or AC corresponding to Rated Power which can be calculated by formula as below.

The Rated Voltage of certain resistance value should be the calculated result or Max. Working Voltage of product series whichever less.

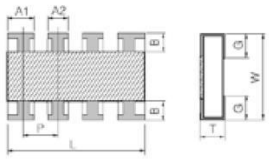
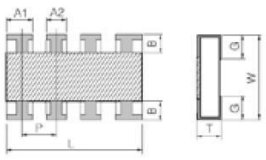
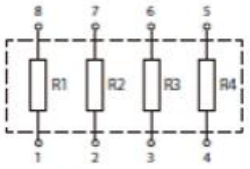
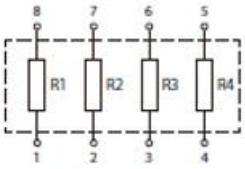
Formula:

$$E = \sqrt{P \times R}$$

E=Rated voltage(V)
P=Rated power(W)
R=Nominal resistance(Ω)

DIMENSIONS

Unit: mm

Series	FA0204（0402×4）	FA0304（0603×4）
Size		
Equivalent circuit	 R1=R2=R3=R4	 R1=R2=R3=R4

Unit: mm

Type	L	W	T	A1	A2	B	P	G
FA0202	1.00±0.10	1.00±0.10	0.35±0.10	0.33±0.10	/	0.15±0.10	0.65±0.05	0.25±0.10
FA0204	2.00±0.10	1.00±0.10	0.45±0.10	0.40±0.05	0.30±0.05	0.20±0.15	0.50±0.05	0.30±0.15
FA0302	1.60±0.15	1.60±0.15	0.50±0.10	0.60±0.15	/	0.30±0.10	0.80±0.05	0.25±0.10
FA0304	3.20±0.20	1.60±0.20	0.50±0.10	0.60±0.15	0.5±0.15	0.30±0.15	0.80±0.10	0.30±0.15

Note:FA0204, FA0302 and FA0304 carry a special dot " ■ " at the top- left corner of their markings for differentiation.

E.g. for "470", the marking is:"  ".

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RELIABILITY

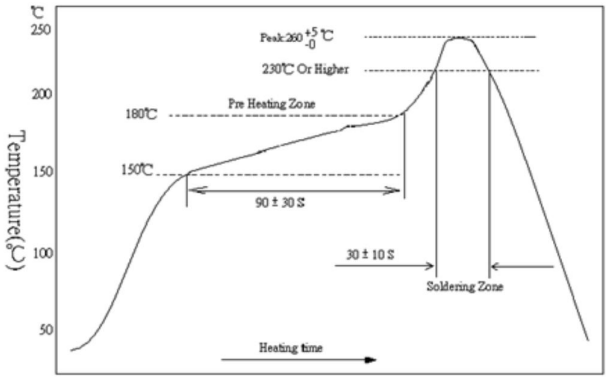
Item	Test Method	Acceptable Criterion
High Temperature Exposure	+155℃, 1000 hrs., unpowered, measure the resistance change rate after test. **Reference: AEC-Q200 Test 3, MIL-STD-202 Method 108**	△R/R: ±(3.0%+0.05Ω)
Temperature Cycling	-55~+155℃, soak time 30min, Transition Time :1minute, 1000 cycles . **Reference: AEC-Q200 Test 4, JESD22 Method JA-104**	△R/R=±(2.0%+0.05Ω)
Biased Humidity	85℃, 85%, 10% rated power, 1000H, after the test and stand 24H to measure the change rate of resistance value for components with specified operating voltages higher or equal to500V, 10% of operating voltage. **Reference: AEC-Q200 TEST 7, MIL-STD-202 Method 103**	1% Series: △R/R=±(2.0%+0.05Ω) 5% Series: △R/R=±(3.0%+0.05Ω)
High Temperature Operating Life	maximum specified operating temperature at 100% rated power without derating, 1000H, 90 min ON,30 min OFF **Reference: AEC-Q200 Test 8, MIL-STD -202 Method 108**	1% Series: △R/R=±(2.0%+0.05Ω) 5% Series: △R/R= ±(3.0%+0.05Ω)
Resistance to Solvent	Immerse in isopropanol solvent at room temperature (23±5℃) for 5min, wipe 10 times with a hard toothbrush, repeat 3 times, take out and blow dry for examination **Reference: AEC-Q200 Test 12, MIL-STD-202 Method 215**	No visible damage
Resistance to Soldering Heat	Reflow test, time above 217 °C is 60s-150s, time above 250 ± 5°C is 30±5s. **Reference: AEC-Q200 TEST 15, MIL-STD-202 Method 210**	△R/R=±(1.0%+0.05Ω)
ESD	Human body mode, two discharges, positive and negative polarity once each. Size: ALL; Test Voltage: 1000V **Reference: AEC-Q200 Test 17, AEC-Q200-002**	△R/R=±(3.0%+0.05Ω)
Solderability	Pretreatment: dry heat 155℃, 4H, after take out, stand at room temperature for 2 hours. Test method B1: Dip the resistance in a tin furnace at 245±5℃ for 5 seconds, then take it out and observe the solder area under a microscope; Test method D: 260±5℃, T=30+5/-0s. **Reference: AEC-Q200 Test 18, J-STD-002 & IEC 60115-1 11.1.4.3**	Soldering coverage over 95% At the edge of terminal, the object underneath (e.g., white ceramic) shall not expose.
Electrical Characterization	$\mathrm{TCR(PPM/℃)} = \frac{(R_2 - R_1)}{R_1 \times (T_2 - T_1)} \times 10^6$ R_1: Resistance value tested at room temperature (Ω) R_2: Resistance value tested at-55℃ or +125℃ T_1: Temperature at room temperature (℃) T_2: Temperature at-55℃ or +125℃ **Reference: AEC-Q200 Test 19,IEC 60115-1 6.2**	R≥10Ω:±200 PPM/℃ R < 10Ω:±400 PPM/℃
Board Flex	The SMD resistance was welded to the test board and bent with the standard pressure block. After standing for 60s under the corresponding deformation condition, the change rate of resistance value of the part was tested. Size: ALL; Depth: 2mm **Reference: AEC-Q200 TEST 21, AEC-Q200-005**	△R/R=±(1.0%+0.05Ω)
Terminal Strength	Apply 1.8Kgf external force on the side of the part to test the solder joint adhesion of the part. **Reference: AEC Q200-005**	No mechanical damage or peel-off of side end
Short Time Overload	Apply 2.5 times rated voltage or maximum overload voltage (whichever is the smallest) for 5 seconds. **Reference: IEC 60115-1 8.1.4.2**	△R/R: ±(2.0%+0.05Ω)

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Item	Test Method	Acceptable Criterion
Mechanical shock	Half sine wave, acceleration 100g's, each three times in X, Y and Z directions, pulse width 6ms **Reference: AEC-Q200 Test 13, MIL-STD -202 Method 213**	△R/R=±(1.0%+0.05Ω) Jumper: < 50mΩ
Vibration	Frequency: 10HZ~2000HZ, acceleration: 5g's, X, Y, Z three directions, 12 cycles in each direction, a total of 36 cycles, a single cycle test for 20min **Reference: AEC-Q200 Test 14, MIL-STD -202 Method 204**	△R/R=±(1.0%+0.05Ω)
Flammability	Protective layer flammability report or component needle flame test report **Reference: AEC-Q200 Test 20, UL-94，IEC 60695-11-5**	Do not burn and cotton below do not ignite
Flame retardancy	9VDC to 32VDC (clamp current 500A) in each increment $1V_{DC}$ for 1 hr. **Reference: AEC-Q200 Test 24, AEC-Q200-001**	1. Nonflammable 2. Do not explode 3. The temperature cannot be higher than 350℃ for 10 sec.
Sulfide test	Put the test sample resistor in sulfur vapor, at a temperature of 105±2℃ for 750hrs **Reference: EIA-977**	△R/R=±(4.0%+0.05Ω)

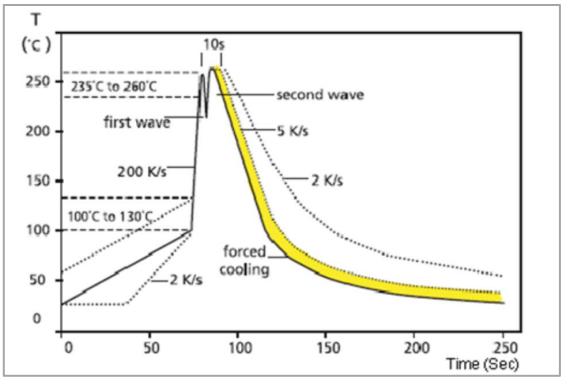
SOLDERING

Lead Free IR Reflow Soldering Profile



- Top temperature should be under 260^{+5}_{0}℃ ,10 sec.
- Reference: J-STD-020D

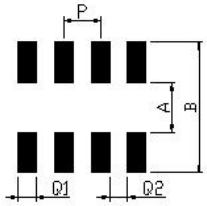
Lead Free Double-Wave Soldering Profile



- Suitable for 0302/0304 size products
- 350±10℃ within 3 sec. if soldering iron.

SOLDERING PAD

Unit: mm

Figure	Type	A	B	P	Q1	Q2
	FA0202	0.50	2.00	0.67	0.33	0.34
	FA0204	0.50	2.00	0.50	0.28	0.22
	FA0302	1.00	2.60	0.80	0.40	0.40
	FA0304	1.00	2.60	0.80	0.40	0.40

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WORKING ENVIRONMENT

If user intends to use products in special environments or states, including but not limited to the following, it is necessary to approve special characteristics and reliability for the following or other application environments.

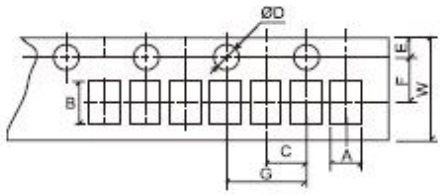
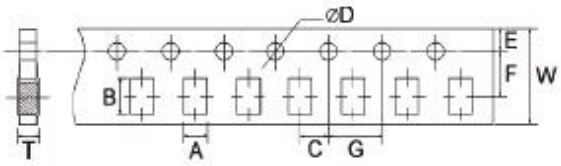
A. Hot temperature.
B. Near the sea, or corrosive gas, such as Cl_2, H_2S, NH_3, SO_2 and NO_2, etc.
C. Unverified liquids, such as water, oil, chemical or organic solvent.
D. Unverified resin or paint to cover products.
E. Products should be washed with water soluble cleaner even if non cleaning flux.

STORAGE / CARRY CONDITIONS

A. Temperature: 25±5℃
B. Humidity: 60±15%RH
C. Storage life: 2 years. FIFO.
D. Please hold box correct orientation when storing and carrying. It is strictly prohibited to fall or squeeze the box, otherwise the product electrode or body may be damaged.

TAPING SPECIFICATIONS

A. Taping drawing

Carrier Taping A	Carrier Taping B
	

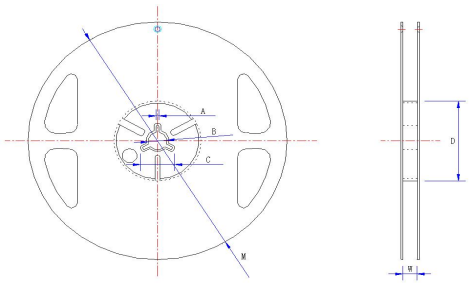
B. Taping Dimensions

Unit: mm

Type or Size		A±0.2	B±0.2	C±0.05	$\text{ØD}^{+0.1}_{-0}$	E±0.1	F±0.05	G±0.1	W±0.2	T±0.1
Carrier Taping A	0202	1.20	1.20	2.00	1.50	1.75	3.50	4.00	8.00	0.45
	0204	1.20	2.20	2.00	1.50	1.75	3.50	4.00	8.00	0.67
Carrier Taping B	0302	1.90	1.90	2.00	1.50	1.75	3.50	4.00	8.00	0.83
	0304	1.90	3.60	2.00	1.50	1.75	3.50	4.00	8.00	0.83

REEL SPECIFICATION

A. Reel drawing



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B. Reel dimension

Unit: mm

Type	SPQ PCS/Rl.	A±0.5	B±0.5	C±0.5	D±1	M±2	W±1
0202	10000	2.0	13.0	21.0	60.0	178.0	10.0
0204	10,000	2.0	13.0	21.0	60.0	178.0	10.0
0302	5,000	2.0	13.0	21.0	60.0	178.0	10.0
0304	5,000	2.0	13.0	21.0	60.0	178.0	10.0

LABEL SPECIFICATION

Produce Label	Customer Label
	

PACKING BOX

A. Packing Type

Taping in reel / Bulk in plastic bag.

B. Inner box

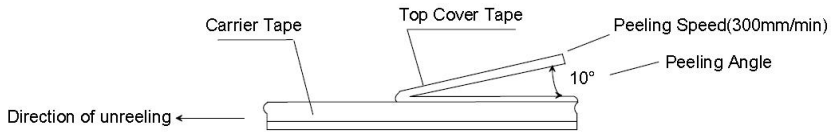
The inner box has several capacities hold 1 reel, 2 reels, 3 reels, 4 reels, 5 reels and 10 reels.

C. Out box

The out box has two capacities hold 6- or 8-pieces inner box.

NOTE OF COVER TAPE PEEL OFF

A. Figure of cover tape peel off.



B. Please keep peeling speed under 300mm per minute.

C. Please keep the angle between cover tape and direction of unreeling narrower than 10 degree.

D. There is limit of adhesive force between cover tape and carrier tape or embossed tape shown as following table.

Size of chip resistors	ALL
Adhesive force limit	10~70gf

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VERSION HISTORY

Version	Date	Change Item(s)	Description
A	2024/07/11	-	First version
B	2024/11/08	Full	Add 0202/0302 size
C	2025/9/4	Dimensions	Updated the of the 0204 specification dimensions tolerance range Update RoHS,Revise the entire text,Update Format , Update “Legal Disclaimer”
D	2025/10/16	FULL	Update the size of 0202 B
E	2026/08/20	Dimensions	Added note for marking identification of FA0204, FA0302 and FA0304

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