

ALTERNATION HISTORY RECORDS 变更记录

Date 日期	Version 版本	Mark 标记	Page 页码	Description 描述	Drafter 制定者	Approver 审批者
2021-1-11	A	/	8	In release	Doris	/

Part Numbering System:

ATT	03	J	B	10K
<u>Series Name:</u> ATT: Triple Rated Power Chip Resistor	<u>Type</u> Inch (mm) 03-0603(1608) 05-0805(2012) 06-1206(3216)	<u>Tolerance</u> F= $\pm 1\%$ J= $\pm 5\%$ P : Jumper	<u>Package</u> A=4Kpcs/7"Reel B=5Kpcs/7"Reel C=10Kpcs/7"Reel M=15Kpcs/7"Reel D=10Kpcs/10"Reel E=20Kpcs/10"Reel	<u>Resistance</u> 1R2=1.2 Ω 10K=10K Ω 10K5=10.5K Ω

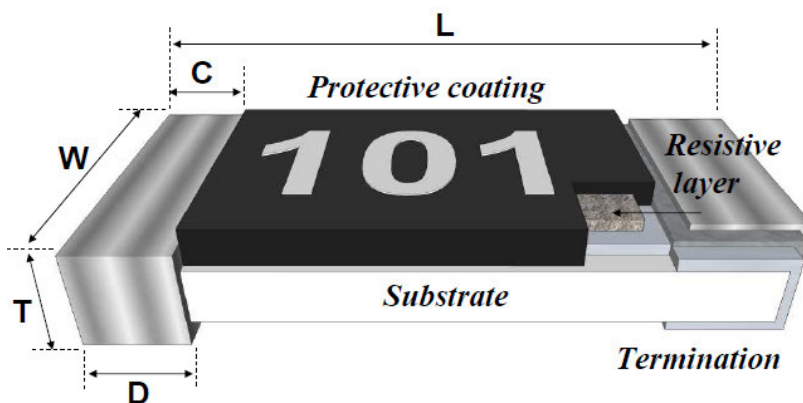
Features

- High power rating to 0.75W of 1206 size.
- High reliability and high precision (1%).
- Suitable for lead free soldering.
- Meet AEC-Q200, RoHS compliant & Halogen Free.

Applications

- Power supply.
- Automotive industry.
- Digital meter, Consumer electronics, M/B.
- LED Lighting.
- Industry control board.

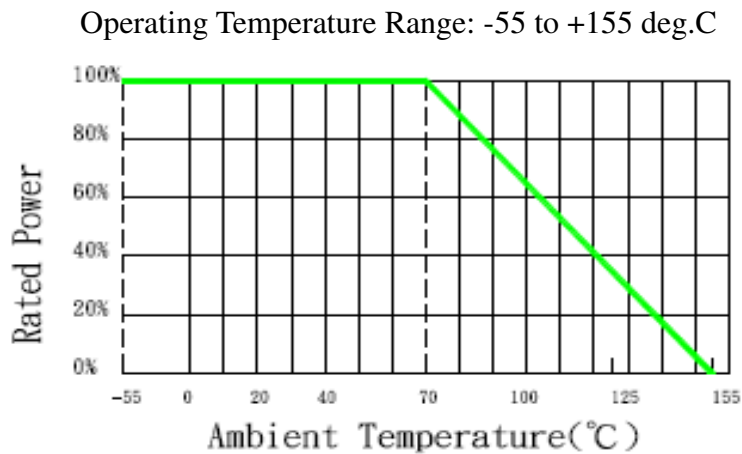
Dimension and Construction



Unit : mm

Type	L	W	C	D	T
ATT03	1.60 \pm 0.10	0.80 \pm 0.10	0.30 \pm 0.20	0.30 \pm 0.20	0.45 \pm 0.10
ATT05	2.00 \pm 0.10	1.25 \pm 0.10	0.40 \pm 0.20	0.40 \pm 0.20	0.50 \pm 0.10
ATT06	3.10 \pm 0.10	1.60 \pm 0.10	0.50 \pm 0.25	0.50 \pm 0.25	0.55 \pm 0.10

Power Derating Curve



Rating

Type	Size	Power Rating at 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance	Temperature Coefficient (ppm/°C)	Resistance Range		Standard Resistance Values
							Min.	Max.	
ATT03	0603	1/3W	75V	125V	±1%(F)	±100ppm	10Ω	1MΩ	E96/E24
					±1%(F)	±200ppm	1Ω	9.76Ω	E96/E24
					±5%(J)	±200ppm	1Ω	1MΩ	E24
ATT05	0805	1/2W	200V	300V	±1%(F)	±100ppm	10Ω	1MΩ	E96/E24
					±1%(F)	±150ppm	1Ω	9.76Ω	E96/E24
					±5%(J)	±200ppm	1Ω	1MΩ	E24
ATT06	1206	3/4W	250V	500V	±1%(F)	±100ppm	1Ω	1MΩ	E96/E24
					±5%(J)	±200ppm	1Ω	1MΩ	E24

Note : $RCWV = (P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.

RCWV : Working Voltage (V) , P : Rated Power (W) , R : Resistance Value (Ω)

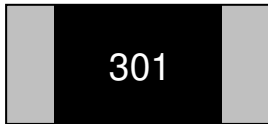
Solder-pad and trace size should be evaluated and board surface temperature should not exceed 105°C when applied full rated power.

Marking/Soldering

Resistance value identify :

E24 $\pm 5\%$: 3 Digits marking to identify the resistance value

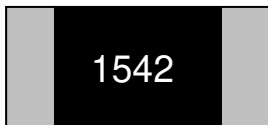
0603/0805/1206



$$301 \rightarrow 30 \times 10^1 = 300\Omega$$

E24/E96 $\pm 1\%$: 4 Digits marking to identify the resistance value

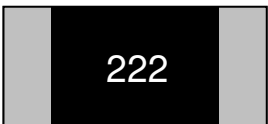
0805/1206



$$1542 \rightarrow 154 \times 10^2 = 15.4 \text{ K}\Omega$$

E24 $\pm 1\%$: 3 Digits marking to identify the resistance value

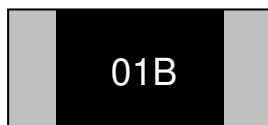
0603



$$222 \rightarrow 22 \times 10^2 = 2.2 \text{ K}\Omega$$

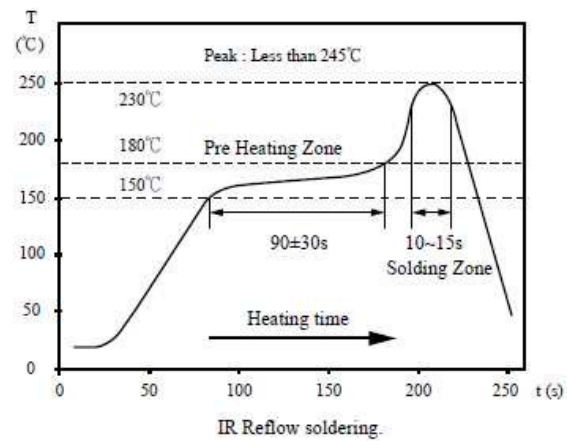
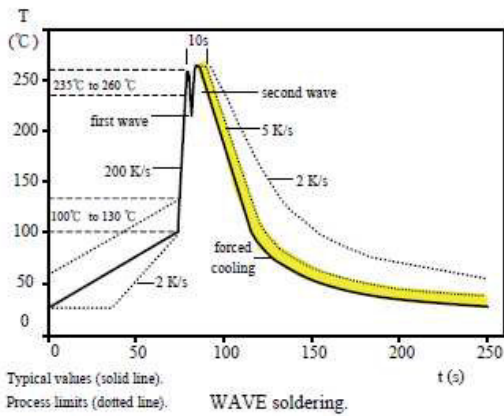
E96 $\pm 1\%$: 3 Digits marking to identify the resistance value

0603



$$01B \rightarrow \text{Refer 0603 marking table} = 1 \text{ K}\Omega$$

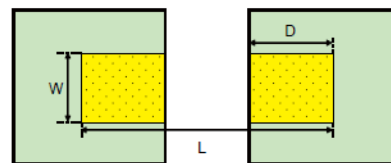
Soldering Reference :



Recommend Solder Pad Dimensions :

Type	W	D	L
FPF03	0.90	1.00	3.00
FPF05	1.30	1.15	3.50
FPF06	1.80	1.30	4.70

Unit:mm



8. Reliability Performance (AEC-Q200)

* Normal test items for standard product.

Test Item	Specification	Test Method (AEC-Q200. IEC 60115)
*DC Resistance	F : ±1% ; J : ±5%	AEC-Q200 TABLE 7.1 IEC 60115-1 / JIS C 5201-1 , Clause 4.5 Measure the resistance Value.

High Temperature Exposure (Storage)	J : $\Delta R \leq \pm(3\%+0.1\Omega)$ F : $\Delta R \leq \pm(1\%+0.05\Omega)$	AEC-Q200 TABLE 7.3 1000 hrs. @ T=125°C. Unpowered. Measurement at 24 ±2 hours after test conclusion.
*Temperature Cycling	J : $\Delta R \leq \pm(1\%+0.1\Omega)$ F : $\Delta R \leq \pm(0.5\%+0.05\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.4 1000 Cycles (-55°C to +125°C). Measurement at 24±2 hours after test conclusion.
Moisture Resistance	J : $\Delta R \leq \pm(1\%+0.1\Omega)$ F : $\Delta R \leq \pm(0.5\%+0.05\Omega)$	AEC-Q200 TABLE 7.6 Test 65°C/80~100%RH/10Cycles. Measurement at 24±2 hours after test conclusion. (t=24hrs/cycle).
Biased Humidity	J : $\Delta R \leq \pm(3\%+0.1\Omega)$ F : $\Delta R \leq \pm(1\%+0.05\Omega)$	AEC-Q200 TABLE 7.7 1000 hours 85°C/85%RH. 10% of operating power. Measurement at 24 ±2 hours after test conclusion.
Operational Life	J : $\Delta R \leq \pm(3\%+0.1\Omega)$ F : $\Delta R \leq \pm(1\%+0.05\Omega)$	AEC-Q200 TABLE 7.8 Test 1000hr @ TA=125°C at specified rated power. Measurement at 24±2 hours after test conclusion.
External Visual	No visual damage and refer PDC marking code.	AEC-Q200 TABLE 7.9 Inspect device construction, marking and workmanship.
Physical Dimension	Within the spec.	AEC-Q200 TABLE 7.10 Verify physical dimensions to the applicable device detail specification.
Mechanical Shock	Within product specification tolerance and no visible damage.	AEC-Q200 TABLE 7.13 Test Peak value:100g's,Wave:Hail-sine, Duration:6ms,Velocity:12.3ft/sec.
Vibration	No mechanical damage.	AEC-Q200 TABLE 7.14 5 g's for 20 min., 12 cycles each of 3 orientations. Test from 10-2000 Hz.
*Resistance to Solder Heat	J : $\Delta R \leq \pm(1\%+0.1\Omega)$ F : $\Delta R \leq \pm(0.5\%+0.05\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.15 Solder dipping @ 270°C ±5°C for 10sec.±1sec.
Thermal Shock	J : $\Delta R \leq \pm(1\%+0.1\Omega)$ F : $\Delta R \leq \pm(0.5\%+0.05\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.16 -55 to 155°C / dwell time 15min/ Max transfer time 20sec/ 300cycles.

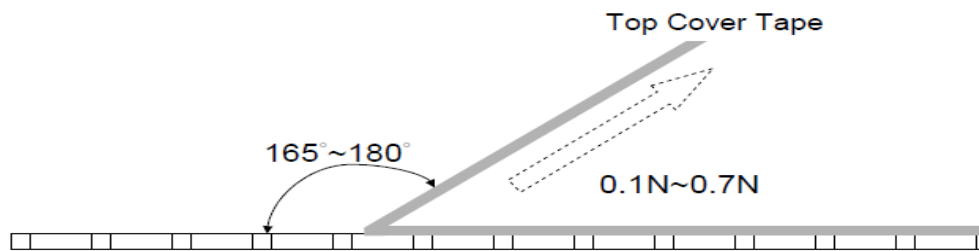
ESD	$\Delta R \leq \pm(1\% + 0.1\Omega)$ No mechanical damage.	AEC-Q200-002 Test contact min. 1KV.
*Solder Ability	Over 95% of termination must be covered with solder.	AEC-Q200 TABLE 7.18 a) Baking 155°C 4H, dipping 235°C 5s b) Steam 1H, dipping 215°C 5s c) Steam 1H, dipping 260°C 7s
Flammability	Refer UL-94.	AEC-Q200 TABLE 7.20 UL-94 V-0 or V-1 are acceptable
*Board Flex	J : $\Delta R \leq \pm(1\% + 0.1\Omega)$ F : $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.21 Bending 2mm 1206, 3mm 0805.0603.
Terminal Strength	No mechanical damage	AEC-Q200 TABLE 7.22 Force 1 Kg for 60 seconds.
*Short Time Overload	J : $\Delta R \leq \pm(2\% + 0.1\Omega)$ F : $\Delta R \leq \pm(1\% + 0.05\Omega)$	IEC 60115-1, Clause 4.13 5 × Rated power for 5 seconds
*Load Life Humidity	J : $\Delta R \leq \pm(3\% + 0.1\Omega)$ F : $\Delta R \leq \pm(1\% + 0.05\Omega)$	IEC 60115-1, Clause 4.24 40±2°C with relative humidity 90% ~ 95% D.C. rated voltage for 1.5 hours ON 30 minutes OFF. Cycle repeated 1000 hours.
*Temperature Coefficient of Resistance (TCR)	Within the spec.	IEC 60115-1, Clause 4.8 $T_1 \quad T_2$ Test temperature : 25°C ~ -55°C 25°C ~ +155°C $TCR(\text{ppm}/^\circ\text{C}) = (R_2 - R_1) / R_1 \times 1 / (T_2 - T_1) \times 10^6$
*Load Life	J : $\Delta R \leq \pm(3\% + 0.1\Omega)$ F : $\Delta R \leq \pm(1\% + 0.05\Omega)$	IEC 60115-1, Clause 4.25 Rated voltage for 1.5 hours for followed by a pause 0.5 hour at 70±2°C. Cycle repeated 1000 hours.
*Insulation Resistance	Between termination and coating must over 1000MΩ	IEC 60115-1, Clause 4.6 Test voltage : 100±15V

9. PACKAGING

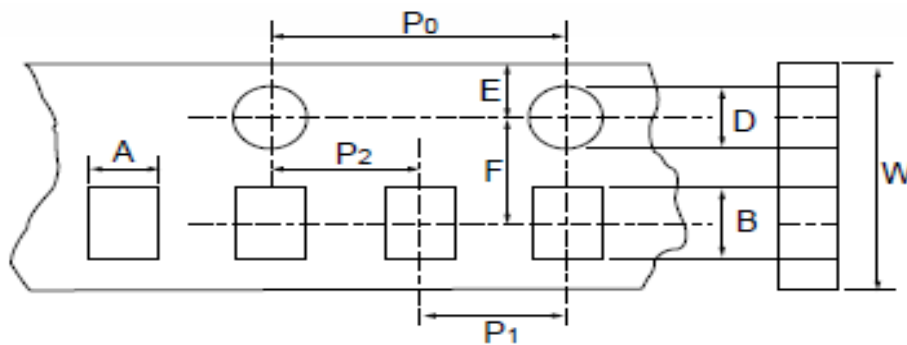
- Peel Strength of Top Cover Tape

The peel speed shall be about 300 mm/min

The peel force of top cover tape shall be between 0.1 to 0.7N



- Tape Packaging Dimensions

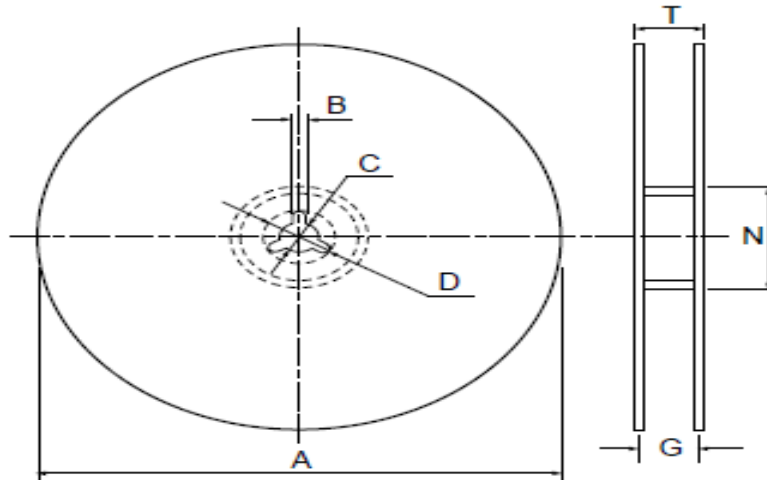


- Accumulated dimensional tolerance $40 \pm 0.2 \text{mm}$

Size	A	B	W	F	E	P1	P2	P0	D
0603	1.10 ± 0.20	1.90 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / - 0$
0805	1.65 ± 0.20	2.40 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / - 0$
1206	2.00 ± 0.20	3.60 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / - 0$

unit : mm

- Reel Dimensions



unit:mm

Size	Packaging Q'ty	A	N	C	D	B	G	T
0603	5kpcs/Reel	178.0±2.0	60.0±0.5	13.0±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
0805	10kpcs/Reel	254.0±2.0	100.0±1.0	13.5±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
1206	20kpcs/Reel	330.0±2.0	100.0±1.0	13.5±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.

Storage & Handling

... Products are recommended to be used up within one year as ensured shelf life.

Check solder ability in case shelf life extension is needed.

... To store products with following condition:

Temperature:5 to 40°C ; Humidity: 20 to 70% relative humidity.

Precaution for use :

The AEC-Q200 series resistors is mainly used on general automotive equipment without safety considerations.

Please contact our company in advanced if you intend to use resistor for designing the equipment which may damage itself and the safety of third party. If necessary, please consider to add the protect circuit in devising process and obtaining fully safety evaluation.