APPROVAL SHEET

Product Name : Thick Film AEC-Q200 Chip Resistor

Part No. : TCQ

Description : Size 0402~2512

For more contact information, please refer to our website: www.rideetech.com

Thick Film AEC-Q200 Chip Resistor—TCQ Series

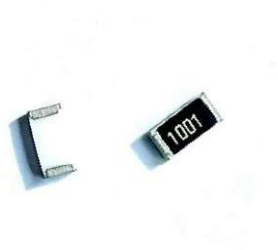
■ Applications

— Automotive electronics

— Heating, Ventilating and Air conditioning

— Indoor lighting, Central door locking, Wiper module

— Navigation equipment,TPMS



■ Features

— All case sizes are available from 0402 to 2512

— Meet AEC-Q200 test for Automotive industry

— RoHS compliant &. Halogen free

■ Part Number Explanation

TCQ	0603	J	1R00	T	S
Product	Size (Inch)	Tolerance	Resistance	Packaging	Functional
Thick Film AEC-Q200 Chip Resistor	0402 0603 0805 1206 1210 2010 2512	F= ±1% J= ±5%	1R00=1Ω 10R0=10Ω 1001=1KΩ 1004=1MΩ	T= Tape & Reel	S= Standard

Standard Electrical Specifications

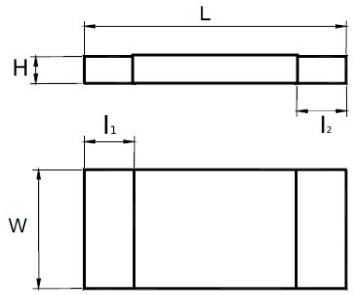
Type	Power Rating at 70℃	Max. RCWV	Max Overload Voltage	Temperature Coefficient (TCR; ppm/℃)	Resistance Range	
					F(±1%)	J(±5%)
TCQ0402	0.063 W	50V	100V	±200	1M<R≦10MΩ	
				±100	10Ω<R≦1MΩ	
				-200~+400	0Ω，1Ω≦R≦10Ω	
TCQ0603	0.1 W	75V	150V	±200	1M<R≦10MΩ	
				±100	10Ω<R≦1MΩ	
				-200~+400	0Ω，1Ω≦R≦10Ω	
TCQ0805	0.125 W	150V	300V	±200	1M<R≦10MΩ	
				±100	10Ω<R≦1MΩ	
				-200~+400	0Ω，1Ω≦R≦10Ω	
TCQ1206	0.25 W	200V	400V	±200	1M<R≦10MΩ	
				±100	10Ω<R≦1MΩ	
				-200~+400	0Ω，1Ω≦R≦10Ω	
TCQ1210	0.5 W	200V	400V	±200	1M<R≦10MΩ	
				±100	10Ω<R≦1MΩ	
				-200~+400	0Ω，1Ω≦R≦10Ω	
TCQ2010	0.75 W	200V	400V	±200	1M<R≦10MΩ	
				±100	10Ω<R≦1MΩ	
				±200	0Ω，1Ω≦R≦10Ω	
TCQ2512	1 W	250V	500V	±200	1M<R≦10MΩ	
				±100	10Ω<R≦1MΩ	
				±200	0Ω，1Ω≦R≦10Ω	

• Functional code: S
• Beyond the above specification also can meet the special requirements. For detail questions, please contact us freely.

Size	0402	0603	0805	1206	1210	2010	2512
Resistance	0R (50mΩ Max)						
Max Rated Current	1A		2A		3A		

• Note：RCWV＝(P×R)1/2 or Max. RCWV listed above, whichever is lower.
• RCWV：Working Voltage (V)，P：Rated Power (W)，R：Resistance Value (Ω)

Dimension

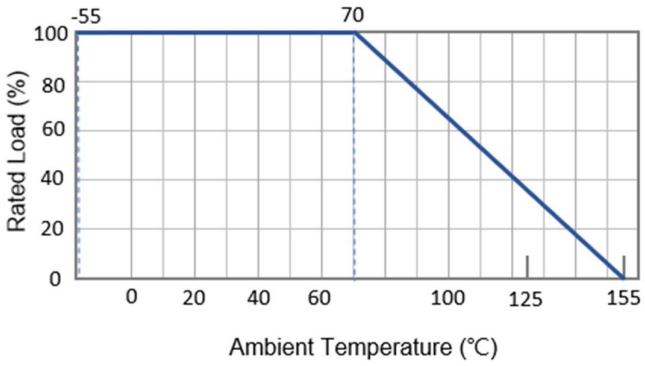


Unit: mm

Type	L	W	l_1	l_2	H
TCQ0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
TCQ0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
TCQ0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
TCQ1206	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
TCQ1210	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
TCQ2010	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
TCQ2512	6.30±0.20	3.10±0.20	0.60±0.25	0.90±0.25	0.60±0.15

■ Derating Curve

Operating Temperature Range: -55 to +155℃



■ Voltage Rating or Current Rating

The direct or alternating voltage for the rated power can be calculated from the following formula but must not exceed the maximum voltage.

V=√P×R

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

■ Recommended Customer Soldering Parameters

■ Recommended IR Reflow Soldering Conditions

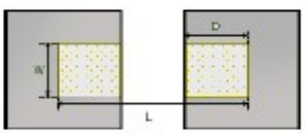
Preliminary heating: 150℃~180℃, 120s max
Soldering: 220℃, 60s max
Peak temperature: 245℃, 15s max

■ Recommended WAVE Soldering Conditions

Reservoir Temperature: 260℃, 10s max
Number of times: two times max

■ Recommend Land Pattern Design

Type	W	D	L
TCQ0402	0.60	0.50	1.50
TCQ0603	0.90	1.00	3.00
TCQ0805	1.30	1.15	3.50
TCQ1206	1.80	1.30	4.70
TCQ1210	3.00	1.30	4.70
TCQ2010	3.00	1.50	6.80
TCQ2512	3.70	1.60	7.60



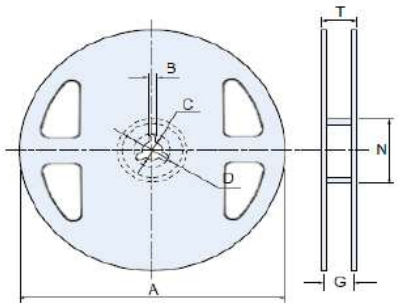
Unit: mm

■ Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	IEC-60115-1 4.8	At 25 / -55℃ and 25℃ /+155℃, 25℃ is the reference temperature	As Spec
Short Time Overload	IEC-60115-1 4.13	2.5 times RCWV or Max. Overload voltage whichever is less for 5 seconds.	J：ΔR ≦ ±(1%＋0.1Ω) F：ΔR ≦ ±(0.5 %＋0.05Ω)
Resistance to Soldering Heat	AEC-Q200 7.15	Solder dipping @ 270℃±5℃ for 10sec.±1sec..	J：ΔR ≦ ±(1%＋0.1Ω) F：ΔR ≦ ±(0.5%＋0.05Ω)No mechanical damage.
Insulation Resistance	IEC-60115-1 4.6	Test voltage：100±15V	Between termination and coating must over 1000MΩ
Temperature Cycling	AEC-Q200 7.4	1000 Cycles (-55°C to +125°C) Measurement at 24±4 hours after test conclusion.	J：ΔR ≦ ±(1%＋0.1Ω) F：ΔR ≦ ±(0.5%＋0.05Ω) No mechanical damage.
Biased Humidity	AEC-Q200 7.7	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±2 hours after test conclusion.	J：△ R≦ ±(3%+0.1Ω) F：△ R≦ ±(1%+0.05Ω)
High Temperature Exposure (Storage)	AEC-Q200 7.3	1000 hrs. @ T=125°C. Unpowered. Measurement at 24±2 hours after test conclusion.	J：△ R≦ ±(3%+0.1Ω) F：△ R≦ ±(1%+0.05Ω)
Operational Life	AEC-Q200 7.8	Test 1000hr @ TA=125℃ at specified rated power. Measurement at 24±2 hours after test conclusion.	J：△ R≦ ±(3%+0.1Ω) F：△ R≦ ±(1%+0.05Ω)
External Visual	AEC-Q200 7.9	Inspect device construction, marking and workmanship.	No visual damage and refer Ridee marking code
Mechanical Shock	AEC-Q200 7.13	Test Peak value:100g's,Wave:Hail-sine, Duration:6ms,Velocity:12.3ft/sec.	Within product specification tolerance and no visible damage.

Vibration	AEC-Q200 7.14	5 g's for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000 Hz	No mechanical damage
Solderability	AEC-Q200 7.18	a) Baking 155℃ 4H, dipping 235℃ 5s b) Steam 1H, dipping 215℃ 5s c) Steam 1H, dipping 260℃ 7s	Over 95% of termination must be covered with solder.
Terminal Strength	AEC-Q200 7.22	Force 1 Kg for 60 seconds.	No mechanical damage
Board Flex	AEC-Q200 7.21	Bending 3mm 0805	J：ΔR ≦ ±(1%＋0.1Ω) F：ΔR ≦ ±(0.5%＋0.05Ω)No mechanical damage.
Moisture Resistance	AEC-Q200 7.6	Test 65℃/80~100%RH/10Cycles. Measurement at 24±2 hours after test conclusion. (t=24hrs/cycle).	J：△R≦ ±(1%+0.1Ω) F：△R≦ ±(0.5%+0.05Ω)
Physical Dimension	AEC-Q200 7.10	Verify physical dimensions to the applicable device detail specification.	Within the spec.
Thermal Shock	AEC-Q200 7.16	-55 to 155℃/ dwell time 15min/ Max transfer time 20sec/ 300cycles.	J：ΔR ≦ ±(1%＋0.1Ω) F：ΔR ≦ ±(0.5%＋0.05Ω)
ESD	AEC-Q200-002	Test contact min. 0.5 KV.	△R ≦ ±(1%+0.1Ω) No mechanical damage.
Damp Heat	IEC 60115-1 4.24	40±2℃ with relative humidity 90% ~ 95% D.C. rated voltage for 1.5 hours ON 30 minutes OFF. Cycle repeated 1000 hours.	△R ≦ ±(3.0%+0.1Ω)
Load Life	IEC 60115-1 4.25	Rated voltage for 1.5 hours for followed by a pause 0.5 hour at 70±2℃. Cycle repeated 1000 hours.	J：△ R≦ ±(3%+0.1Ω) F：△ R≦ ±(1%+0.05Ω)

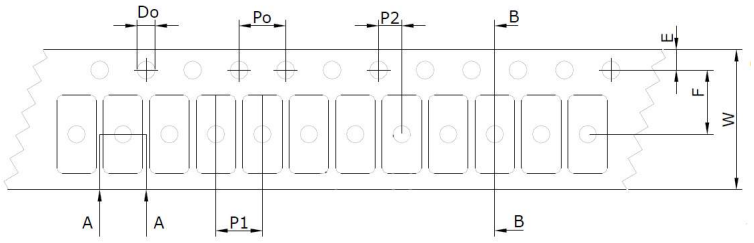
Packaging Information



Unit:mm

Size	Packaging Q'ty	A	N	C	D	B	G	T
0402	10Kpcs/Reel	178±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max
0603 0805 1206 1210	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.
2010 2512	4kpcs/Reel	178.0±2.0	60.0±0.5	13.0±0.5	20(Min.)	2.0±0.5	13.8±1.5	16.7max.

Tapping Specification



Unit:mm

Size	A	B	W	F	E	P1	P2	Po	Do
0402	0.70±0.10	1.20±0.10	8.00±0.30	1.75±0.10	3.50±0.05	2.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
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
1210	3.00±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
2010	2.80±0.20	5.50±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
2512	3.50±0.20	6.70±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0

Marking

E24 ±5%：3 Digits marking to identify the resistance value

0603/0805/1206/2010/2512

Resistance	300Ω
3 digits code	301

E24/E96 ±1%：4 Digits marking to identify the resistance value

0805/1206/2010/2512

Resistance	15.4KΩ
4 digits code	1542

E24 ±1%：3 Digits marking to identify the resistance value

0603

Resistance	2.2KΩ
3 digits code	222

E96 ±1%：3 Digits marking to identify the resistance value

0603

No marking of 0402 product.