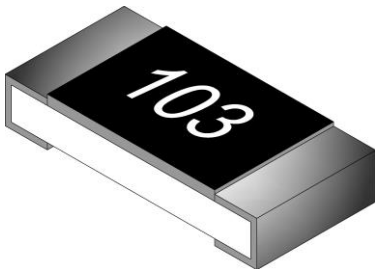




QUH Series Automotive Ultra High Power
Chip Resistor Product Specifications

Document No.	S-10-12-43-19
Released Date	2024/12/19
Page No.	1/12

■ Automotive Ultra High Power Chip Resistor — QUH Series



■ Application

- Automotive electronics
- Navigation equipment, TPMS
- Heating, Ventilating and Air conditioning
- Indoor lighting, Central door locking, Wiper module

■ Features

- Small size and light weight
- Reliability, high quality
- CCD visual quality inspection
- AEC-Q200 Compliant
- Excellent Resistance to Vulcanization
(ASTM-B-809-95 & EIA-977 Specification)

■ Parts Number Explanation

Example :

QUH	0603	F	10R0	P	05	Z
Product Type	Size (Inch)	Resistor Tolerance	Resistor Value	Package	Quantity	Optional
QUH	0402 0603 0805 1206 1210 2010 2512	D : ±0.5% F : ±1% G : ±2% J : ±5%	1R=1R00 10R=10R0 100R=100R 1K=1K00 1M=1M00	P : Paper Taping (0603~1210) Q : Paper Taping (0402) E : Embossed Taping	04 : 4000PCS 05 : 5000PCS 10 : 10000PCS 20 : 20000PCS 40 : 40000PCS 50 : 50000PCS	Z : Ultra High Power A : Anti-sulfur Option Available.



QUH Series Automotive Ultra High Power
Chip Resistor Product Specifications

Document No.	S-10-12-43-19
Released Date	2024/12/19
Page No.	2/12

■ Ultra High Power Rating Electrical Specifications

Item Type	Rated Power at 70℃	Max Working Voltage	Max Overload Voltage	T.C.R. (PPM/℃)	Resistance Range		
					D(±0.5%)	F(±1%) G(±2%)	J(±5%)
QUH0402	0.2W	50V	100V	±400	-	1Ω≤R<10Ω	
				±100	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ	
QUH0603	0.33W	150V	200V	±400	-	1Ω≤R<10Ω	
				±100	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ	
QUH0805	0.5W	400V	800V	±400	-	1Ω≤R<10Ω	
				±100	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ	
QUH1206	0.75W	200V	400V	±400	-	1Ω≤R<10Ω	
				±100	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ	
QUH1210	1 W			±400	-	1Ω≤R<10Ω	
				±100	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ	
QUH2010	1.5 W			±400	-	1Ω≤R<10Ω	
				±150	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ	
QUH2512	3W	250V	500V	±400	-	1Ω≤R<10Ω	
				±150	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ	

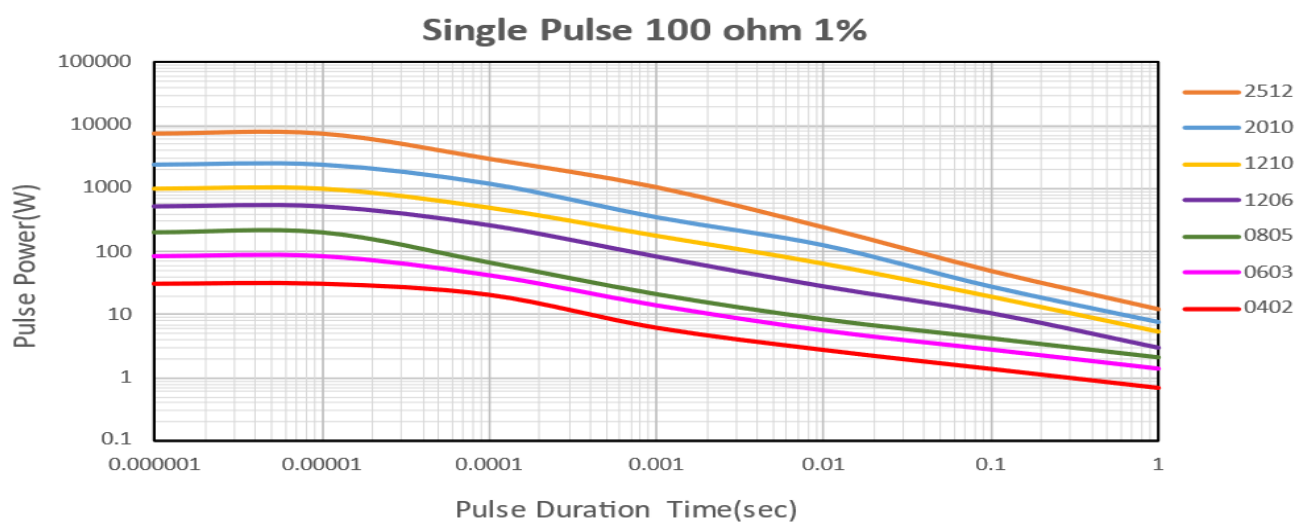
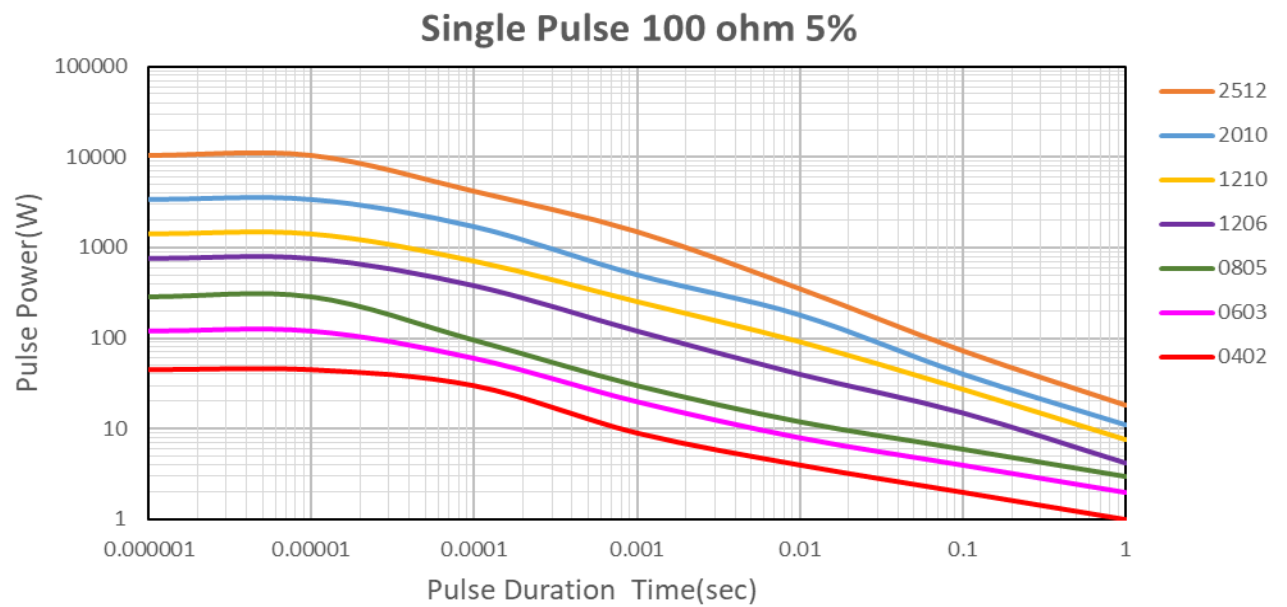
- For non-standard parts, please contact our sales dept.
- Operating Temperature Range : -55℃ ~ +155℃.



QUH Series Automotive Ultra High Power
Chip Resistor Product Specifications

Document No.	S-10-12-43-19
Released Date	2024/12/19
Page No.	3/12

■ Single Pulse Power:



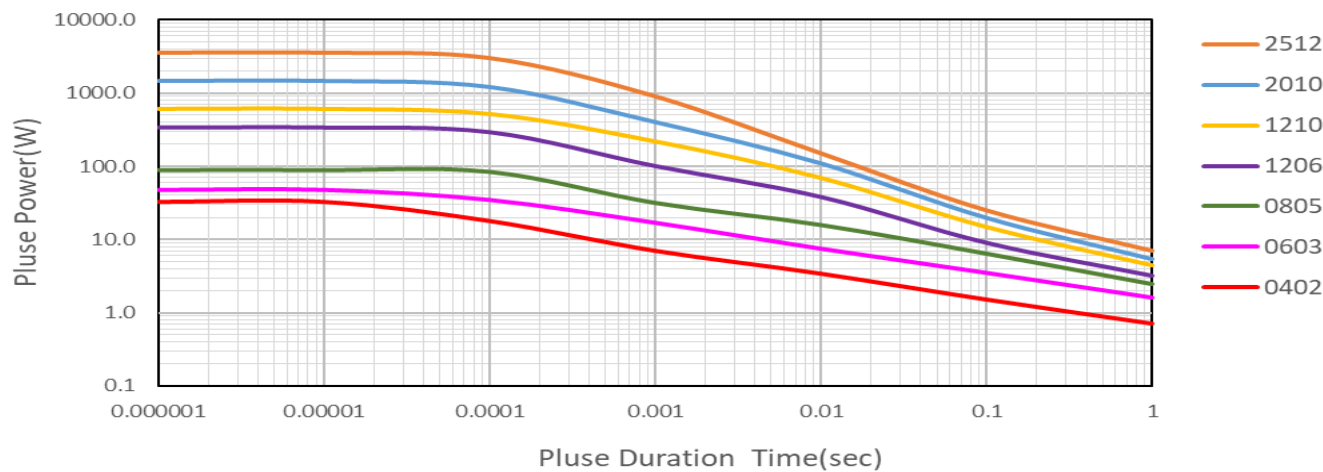


QUH Series Automotive Ultra High Power
Chip Resistor Product Specifications

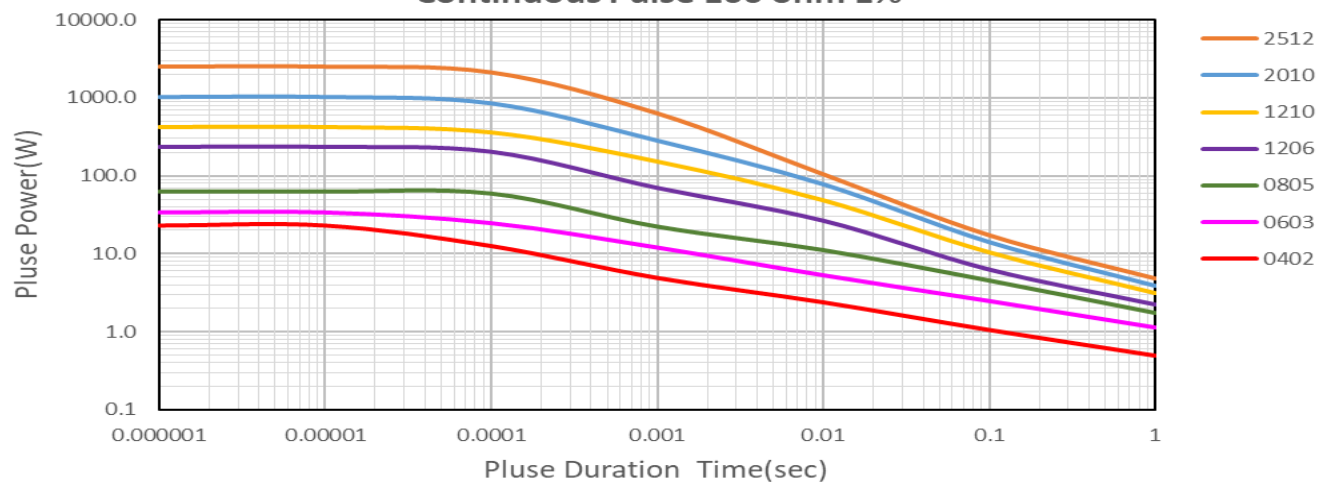
Document No.	S-10-12-43-19
Released Date	2024/12/19
Page No.	4/12

■ Continuous Pulse Power:

Continuous Pulse 100 ohm 5%



Continuous Pulse 100 ohm 1%



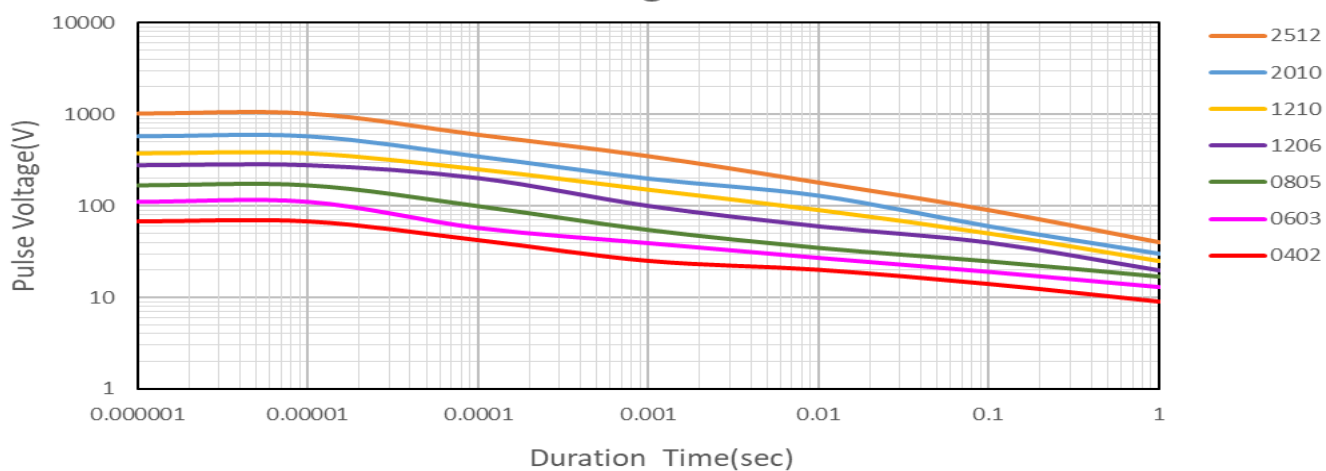


QUH Series Automotive Ultra High Power Chip Resistor Product Specifications

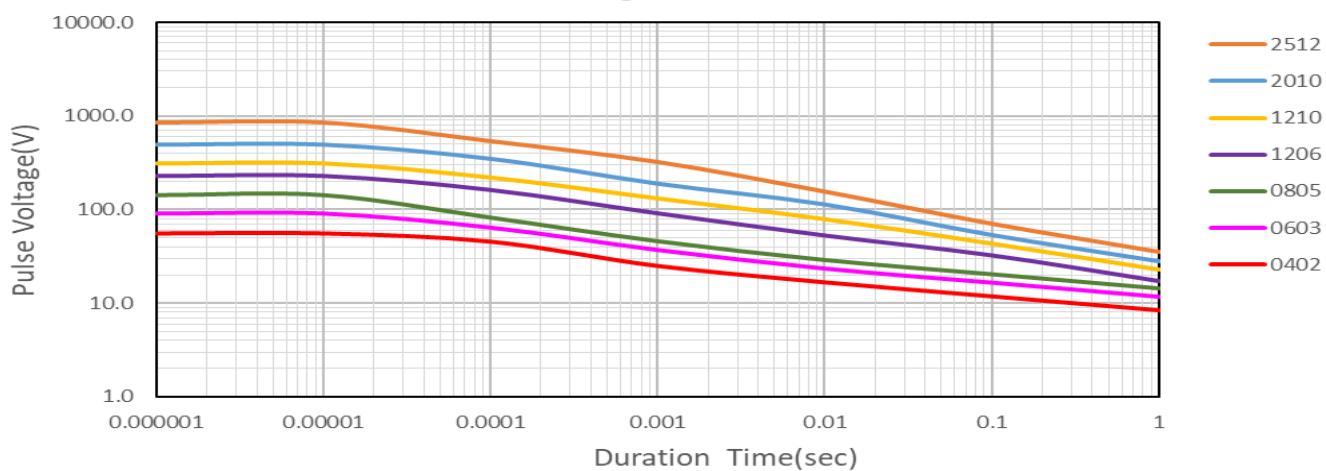
Document No.	S-10-12-43-19
Released Date	2024/12/19
Page No.	5/12

■ Pulse Voltage:

Pulse Voltage 100 ohm 5%



Pulse Voltage 100 ohm 1%

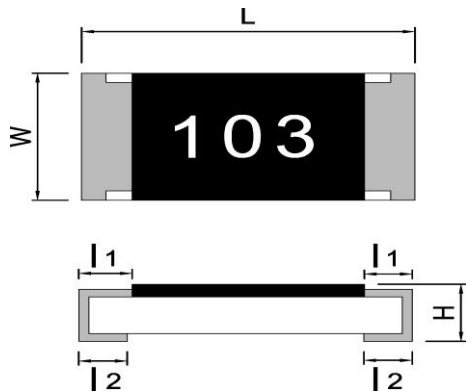




QUH Series Automotive Ultra High Power
Chip Resistor Product Specifications

Document No.	S-10-12-43-19
Released Date	2024/12/19
Page No.	6/12

■ Type Dimension



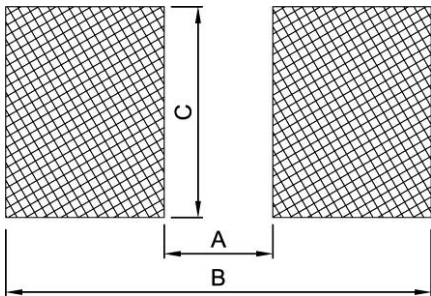
QUH0402 / QUH0603 / QUH0805 / QUH1206 /
QUH1210 / QUH2010 / QUH2512

Unit: mm

Type	L	W	H	l ₁	l ₂
QUH0402	1.00 ± 0.05	0.50 ± 0.05	0.30 ± 0.05	0.15 ± 0.10	0.20 ± 0.10
QUH0603	1.60 ± 0.10	0.80 ± 0.10	0.40 ± 0.10	0.30 ± 0.20	0.30 ± 0.10
QUH0805	2.00 ± 0.10	1.25 ± 0.10	0.50 ± 0.15	0.30 ± 0.15	0.40 ± 0.15
QUH1206	3.05 ± 0.10	1.60 ± 0.10	0.55 ± 0.15	0.40 ± 0.20	0.50 ± 0.20
QUH1210	3.05 ± 0.10	2.50 ± 0.15	0.55 ± 0.15	0.50 ± 0.20	0.50 ± 0.20
QUH2010	5.00 ± 0.20	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.20	0.60 ± 0.20
QUH2512	6.30 ± 0.20	3.20 ± 0.15	0.68 ± 0.15	0.60 ± 0.20	0.60 ± 0.20

● General Information

■ Recommend Land Pattern Design



■ Dimension

Unit: mm

Type Item	0402	0603	0805	1206	1210	2010	2512
A	0.60	0.80	1.30	2.20	2.00	3.80	4.90
B	1.60	2.40	2.90	4.20	4.40	6.60	8.10
C	0.70	1.00	1.40	1.70	2.70	2.70	3.40

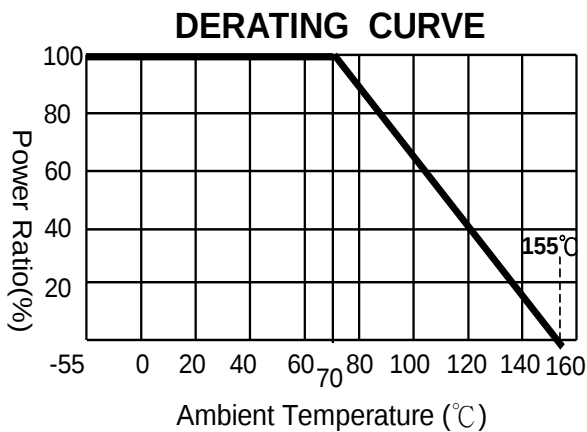


QUH Series Automotive Ultra High Power
Chip Resistor Product Specifications

Document No.	S-10-12-43-19
Released Date	2024/12/19
Page No.	7/12

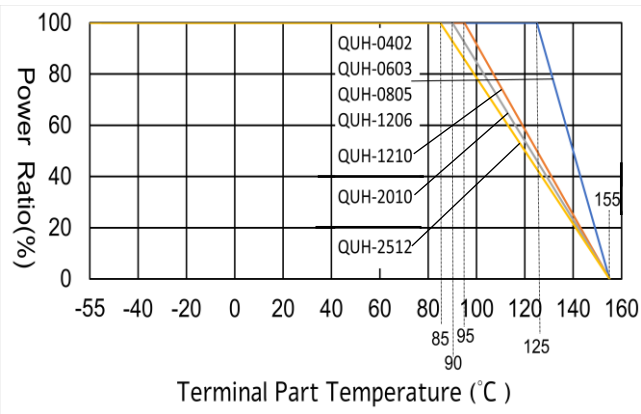
■ Performance Characteristics

■ Power Derating Curve



Power rating or current rating is in the case based on continuous full-load at ambient temperature of 70°C. For operation at ambient temperature in excess of 70°C, the load should be derated in accordance with figure of derating Curve.

■ Terminal part temperature



For resistors operated terminal part temperature of described for each size or above, a power rating shall bederated in accordance with derating curve.

■ Voltage Rating or Current Rating

Resistance Range: $\geq 1\Omega$

Rated Voltage: The resistor shall have a DC continuous working voltage or a RMS AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined formula as following:

$$E(RCWV)=\sqrt{P \times R}$$

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



QUH Series Automotive Ultra High Power Chip Resistor Product Specifications

Document No. S-10-12-43-19

Released Date 2024/12/19

Page No. 8/12

• Reliability Test and Requirement

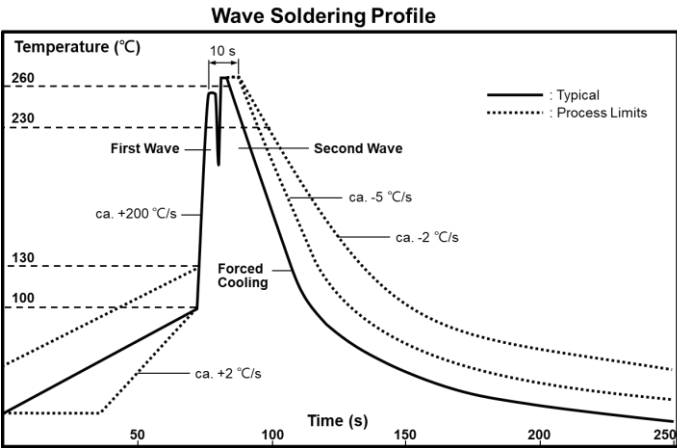
Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25°C / -55°C and 25°C / +155°C, 25°C is the reference temperature	As Spec
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	Ultra Power : 5 × Rated power or Max Overload Voltage whichever is less for 5 seconds	±1 : ±(1.0%+0.05Ω) ±5 : ±(2.0%+0.1Ω)
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260±5°C for 30 seconds.	Individual leaching area ≤ 5% Total leaching area ≤ 10%
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260±5°C for 10 seconds.	±1 : ±(0.5%+0.05Ω) ±5 : ±(1.0%+0.05Ω)
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Apply 100VDC for 1 minute.	≥ 10GΩ
Temperature Cycling	JESD22 Method JA-104	1000 Cycles (-55°C to +125°C) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme.	1% : ±(0.5%+0.05Ω) 5% : ±(1.0%+0.10Ω)
Resistance to Solvent	MIL-STD-202 Method 215	Add Aqueous wash chemical - OKEM Clean or equivalent.	1% : ±(0.5%+0.05Ω) 5% : ±(0.5%+0.05Ω)
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	1% : ±(1.0%+0.05Ω) 5% : ±(3.0%+0.05Ω)
High Temperature Exposure (Storage)	MIL-STD-202 Method 108	1000 hrs. @ T=155°C. Unpowered. Measurement at 24±4 hours after test conclusion.	1% : ±(0.5%+0.05Ω) 5% : ±(2.0%+0.05Ω)
Operational Life	MIL-STD-202 Method 108	Condition D Steady State TA=125°C at derated power. Measurement at 24±4 hours after test conclusion.	1% : ±(1.0%+0.05Ω) 5% : ±(3.0%+0.10Ω)
External Visual	MIL-STD-883 Method 2009	Electrical test not required. Inspect device construction, marking and workmanship.	—
Mechanical Shock	MIL-STD-202 Method 213	Wave Form : Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration(D) is 6(ms)	±1 : ±(1.0%+0.05Ω) ±5 : ±(2.0%+0.1Ω)
Vibration	MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000 Hz	±1 : ±(1.0%+0.05Ω) ±5 : ±(2.0%+0.1Ω)
ESD	AEC-Q200- 002 or ISO/DIS 10605	Human body model 0402 / 0603 : 1KV 0805 and above : 2KV	±(3%+0.05Ω)
Solderability	J-STD-002	(1) 4 hrs 155°C dry heat (2) 245±5°C 3 sec.	±1 : ±(0.5%+0.05Ω) ±5 : ±(1.0%+0.05Ω)
Terminal Strength (SMD)	AEC Q200-006	Pressurizing force for 60 seconds 0402 / 0603 : 8N ; 0805 and above : 17.7N	No broken
Board Flex	AEC Q200-005	Bending once for 60 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm	±1 : ±(1.0%+0.05Ω) ±5 : ±(1.0%+0.05Ω)
Single pulse high voltage overload	IEC-60115	Severity No. 4: $U = 10 \times \sqrt{P_{70} \times R}$ or $U = 2 \times U_{MAX}$; whichever is the less severe. One pulse per minute, 10 pulses 10 / 700 μs.	±(1.0%+0.05Ω)
Sulfur Test (For Optional "A")	ASTM-B-809-95 EIA-977	105±2°C, no rating power for 1000 hrs	ΔR : ±(2.0%+0.05 Ω)



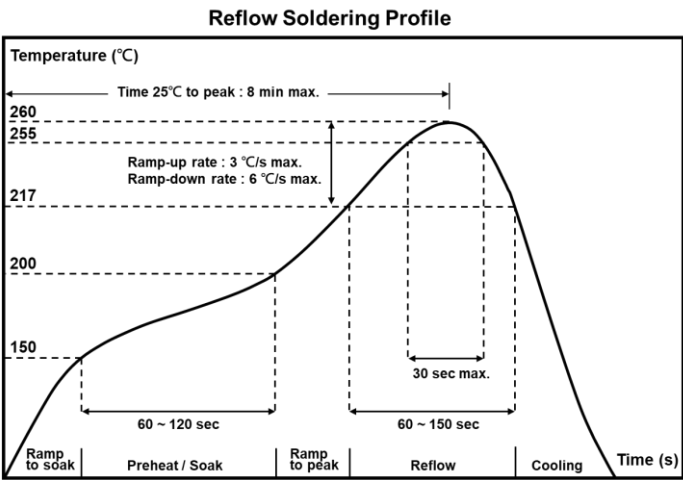
QUH Series Automotive Ultra High Power
Chip Resistor Product Specifications

Document No.	S-10-12-43-19
Released Date	2024/12/19
Page No.	9/12

- Recommended Customer Soldering Parameters
 - Wave solder Temperature condition



- Solder reflow Temperature condition



- Rework temperature (hot air equipment) : 350°C, 3~5seconds

Under the recommended conditions, repeat reflow not more than three times.

- Recommended reflow methods

IR, vapor phase oven, hot air oven

If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements



QUH Series Automotive Ultra High Power
Chip Resistor Product Specifications

Document No.	S-10-12-43-19
Released Date	2024/12/19
Page No.	10/12

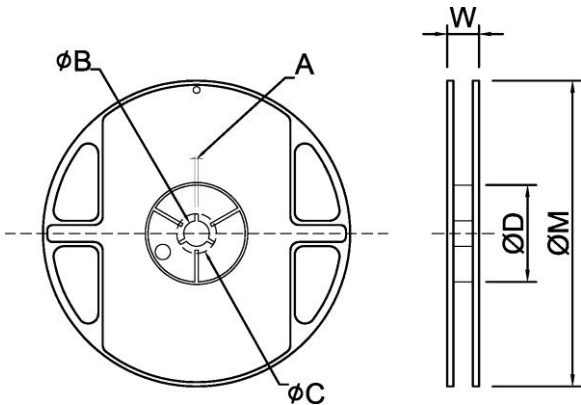
■ Guaranteed plating thickness

Plating Nickel ≥2μm

Plating Tin ≥3μm

■ Appendix For SMD Chip Resistor

● Packaging Information



■ Dimension

Unit: mm

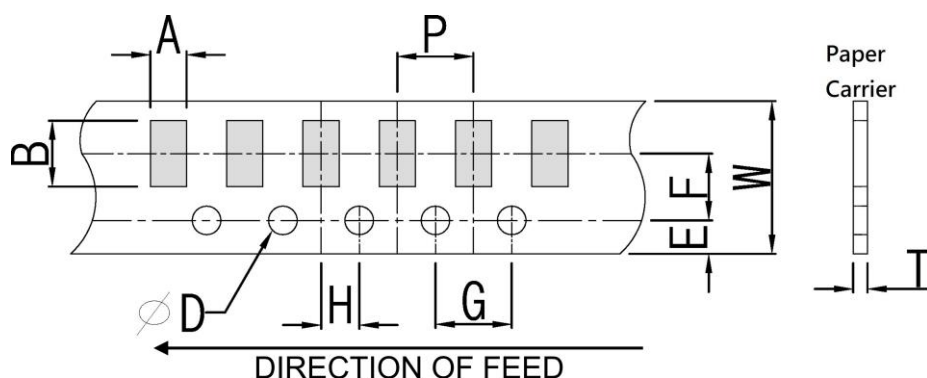
Type	Size		A	φB	φC	φD	W	φM
0402	7"	10K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	11.5±2.0	178±2.0
	13"	40K/50K Reel	2.0±0.5	13.5±1.0	21±1.0	100±1.0	11.5±2.0	330±2.0
0603/0805/1206/1210	7"	5K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	11.5±2.0	178±2.0
0603/0805 /1206	10"	10K/Reel	2.0±0.5	13.5±1.0	21±1.0	100±1.0	11.5±2.0	254±2.0
	13"	20K/Reel	2.0±0.5	13.5±1.0	21±1.0	100±1.0	11.5±2.0	330±2.0
2010/2512	7"	4K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	16.0±2.0	178±2.0



QUH Series Automotive Ultra High Power Chip Resistor Product Specifications

Document No.	S-10-12-43-19
Released Date	2024/12/19
Page No.	11/12

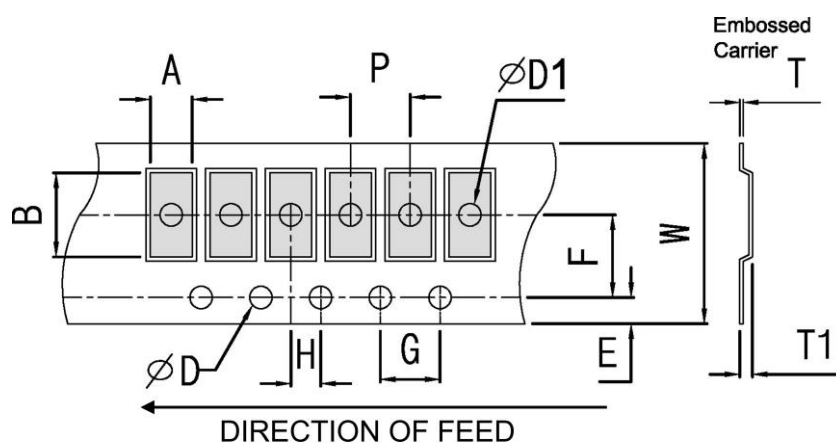
■ Tapping Specification



■ Dimension

Unit:mm

Packaging	Type	A	B	W	E	F	G	H	T	ϕD	P
Paper Type	0402	0.70 ± 0.1	1.20 ± 0.1	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	0.45 ± 0.1	$1.50^{+0.10}_{-0}$	2.0 ± 0.1
	0603	1.05 ± 0.2	1.80 ± 0.2	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	0.60 ± 0.1		4.0 ± 0.1
	0805	1.55 ± 0.2	2.30 ± 0.2	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	0.75 ± 0.1		
	1206	1.90 ± 0.2	3.50 ± 0.2	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	0.75 ± 0.1		
	1210	2.85 ± 0.2	3.50 ± 0.2	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	0.75 ± 0.1		



■ Dimension

Unit:mm

Packaging	Type	A	B	W	E	F	G	H	T	ϕD	$\phi D1$	T1	P
Embossed Type	2010	2.80 ± 0.2	5.60 ± 0.2	12 ± 0.1	1.75 ± 0.1	5.5 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	0.23 ± 0.1	$1.50^{+0.10}_{-0}$	1.50 ± 0.1	0.85 ± 0.15	4.0 ± 0.1
	2512	3.40 ± 0.2	6.70 ± 0.2	12 ± 0.1	1.75 ± 0.1	5.5 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	0.23 ± 0.1		1.50 ± 0.1	0.95 ± 0.15	



QUH Series Automotive Ultra High Power Chip Resistor Product Specifications

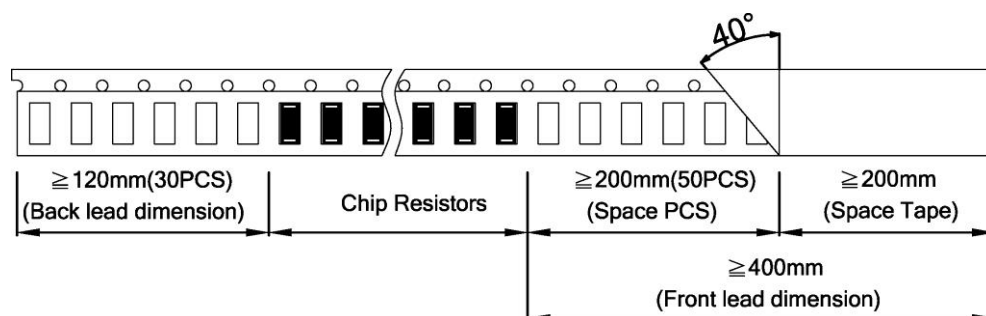
Document No. S-10-12-43-19

Released Date 2024/12/19

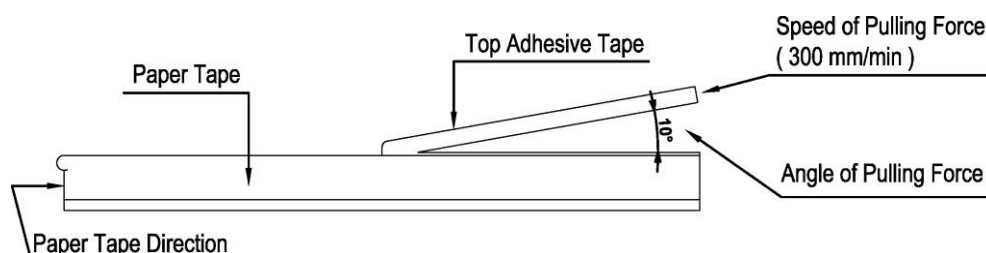
Page No. 12/12

■ Packing Material Data/Storage Data

■ Front & Back Lead Dimension

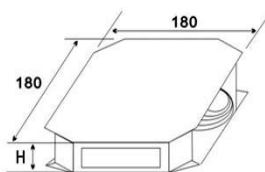


■ Top Adhesive Peel Off Strength : 10~70g

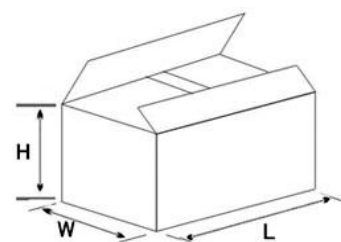


■ Package

Inner Box Size	
Reel	Size H(mm)
1	13
2	24
3	36
5	60
10	113



External Box Size			
Contain (Kpcs)	Length (mm)	Width (mm)	Height (mm)
25K	180	180	60
50K	180	180	110
150K	430	200	200
300K	400	400	200



■ Storage Data :

Storage time at the environment temp: $25\pm 5^{\circ}\text{C}$ & humidity: $60\pm 20\%$ is valid for two years.

■ Product Testing Method:

Our products are tested with our company's tapping & testing equipments by using four-feet probe to touch at the back of both electrodes. Supposed different testing points or methods are requested, please advise beforehand and customized-made production is available.