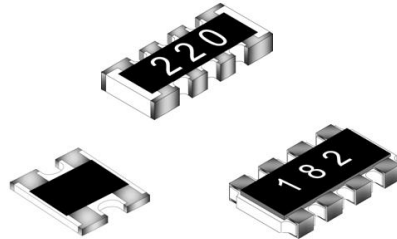




QRA-Series Automotive Array Chip Resistor Product Specifications

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■ Automotive Array Chip Resistor — QRA Series



■ Application

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

■ Features

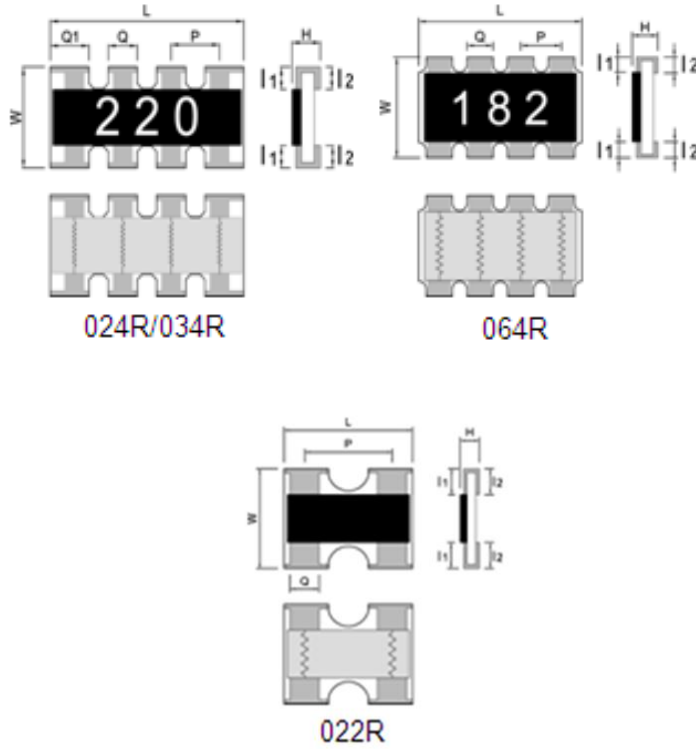
- Small size and light weight
- Reliability, high quality
- CCD visual quality inspection



QRA-Series Automotive Array Chip Resistor Product Specifications

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■ Type Dimension



■ Dimension

Unit: mm

TYPE	L	W	H	I ₁	I ₂	P	Q	Q1
QRA022R	1.00±0.10	1.00±0.10	0.33±0.05	0.15±0.10	0.25±0.10	0.67±0.10	0.34±0.10	---
QRA024R	2.00±0.10	1.00±0.10	0.40±0.10	0.20±0.10	0.20±0.10	0.50±0.10	0.30±0.10	0.43±0.10
QRA034R	3.20±0.20	1.60±0.15	0.50±0.10	0.30±0.20	0.30±0.20	0.80±0.20	0.50±0.15	0.61±0.10
QRA064R	5.10±0.20	3.10±0.20	0.55±0.15	0.55±0.15	0.55±0.15	1.30±0.20	0.90±0.10	---



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Standard Electrical Specifications

Item Type	Rating Power at 70°C	Max Working Voltage	Max Overload Voltage	T.C.R. (PPM/°C)	Resistance Range
					F(±1%)、J(±5%)
QRA022R	0.063 W	25V	50V	±400	1Ω~9.9Ω
				±200	10Ω~1MΩ
QRA024R	0.063 W	25V	50V	±400	1Ω~9.9Ω
				±200	10Ω~1MΩ
QRA034R	0.1 W	50V	100V	±400	1Ω~9.9Ω
				±200	10Ω~1MΩ
QRA064R	0.25 W	200V	400V	±400	1Ω~9.9Ω
				±200	10Ω~1MΩ

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

Type	022R	024R	034R	064R
Jumper Rated Current	1A			2A

Parts Number Explanation

Example:

QRA	024R	J	10R0	Q	10	Z
Product Type	Size (Inch)	Resistor Tolerance	Resistors Value	Package	Quantity	Optional
	022R(0402*2) 024R(0402*4) 034R(0603*4) 064R (1206*4) R : CONVEX	B : ±0.1% C : ±0.25% D : ±0.5% F : ±1% G : ±2% J : ±5% K : ±10% L : ±15% M : ±20% N : ±30%		P、Q : Paper Taping E : Embossed Taping D : Packed in a Bag	01 : 1000PCS 02 : 2000PCS 04 : 4000PCS 05 : 5000PCS 10 : 10000PCS 20 : 20000PCS 40 : 40000PCS 50 : 50000PCS	

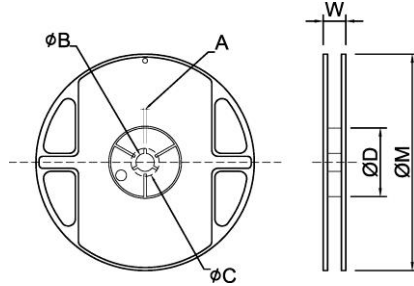


QRA-Series Automotive Array Chip Resistor Product Specifications

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Appendix For SMD Chip Resistor

● Packaging Information

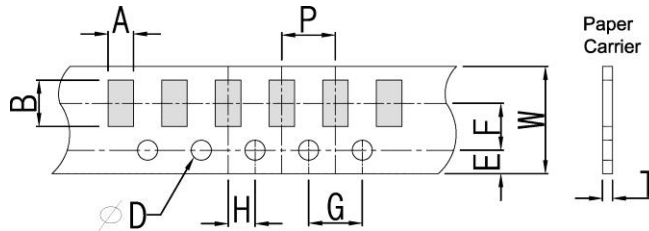


Dimension

Unit: mm

TYPE	SIZE	A	ϕB	ϕC	ϕD	W	ϕM	
022R/024R	7"	10K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	11.5±2.0	178±2.0
034R	7"	5K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	11.5±2.0	178±2.0
064R	7"	4K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	16.0±2.0	178±2.0

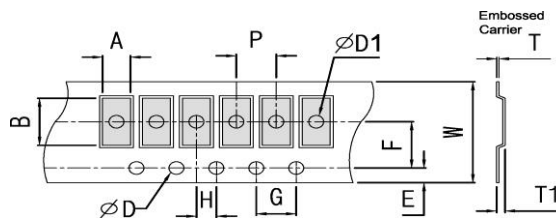
■ Tapping Specification



Dimension

Unit: mm

Packaging	Type	A	B	W	E	F	G	H	T	ϕD	P
Paper Type	022R	1.25±0.1	1.25±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	+0.10	2.0±0.1
	024R	1.20±0.1	2.20±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	0.60±0.1	1.50	
	034R	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	-0	4.0±0.1



Dimension

Unit: mm

Packaging	Type	A	B	W	E	F	G	H	T	ϕD	$\psi D1$	T1	P
Embossed Type	064R	3.55±0.2	5.55±0.2	12±0.3	1.75±0.1	5.5±0.05	4.0±0.1	2.0±0.05	0.25±0.1	+0.10	+0.25	0.85±0.15	4.0±0.1
										-0	-0		

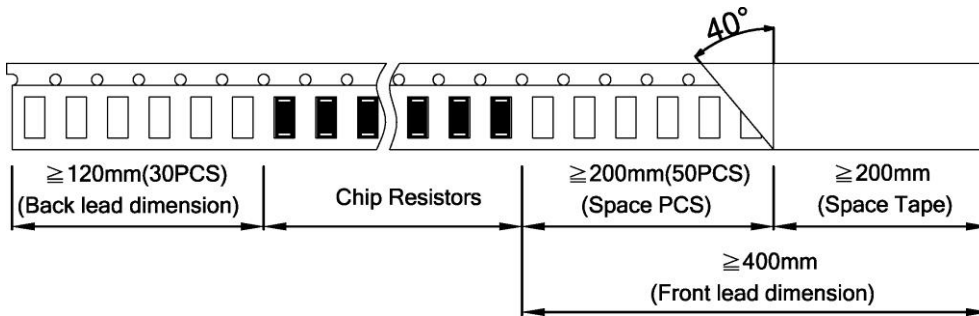


QRA-Series Automotive Array Chip Resistor Product Specifications

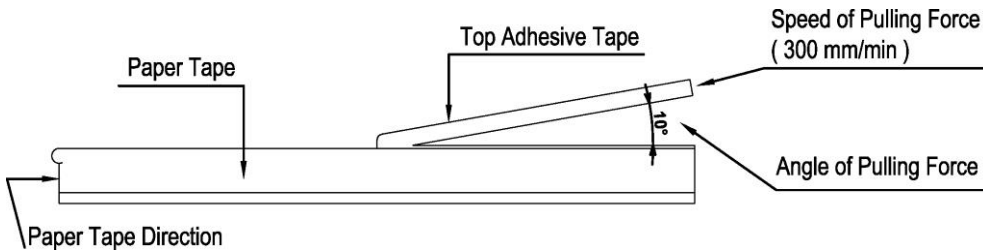
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■ Packing Material Data/Storage Data

■ Front & Back Lead Dimension

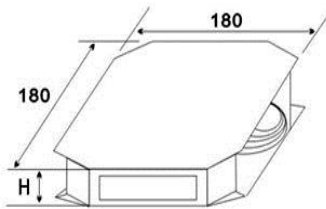


■ Top Adhesive Peel Off Strength : 10~70g

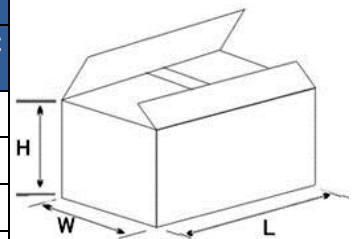


■ Package

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 one year from the date of delivery.



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● Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS C 5201-1 clause 4.8	-55°C or +155°C, 25°C is the reference temperature	Refer to Ratings
Short Time Overload	JIS C 5201-1 clause 4.13	General : 2.5 times RCWV or Max. Overload voltage whichever is less for 5 seconds.	1% : ±(1.0%+0.05Ω) 5% : ±(2.0%+0.1Ω)
IR Reflow	Sony SS-00254	<p>Peak : 250⁺⁵ °C 230°C or higher</p> <p>180°C --- Pre Heating Zone</p> <p>150°C --- 90 ± 30 s</p> <p>30 ± 10 s --- Soldering Zone</p> <p>Heating Time</p>	1% : ±(1.0%+0.05Ω) 5% : ±(1.0%+0.05Ω)
Leaching	Sony SS-00254-9	260±5°C for 30 seconds.	>95% Coverage
Soldering Heat	JIS C 5201-1 clause 4.18	260±5°C for 10 seconds.	1% : ±(0.5%+0.05Ω) 5% : ±(1.0%+0.05Ω))
Temperature Cycling	JIS C 5201-1 clause 4.19	-55°C to +155°C, 5 cycles	1% : ±(0.5%+0.05Ω) 5% : ±(1.0%+0.10Ω)
Electric Iron	Sony SS-00254-5	Preheating temperature : 350±10°C Electric iron preheating time : 3+1/-0 sec	1% : ±(1.0%+0.05Ω) 5% : ±(1.0%+0.05Ω)
Resistance to Solvent	JIS C 5201-1 clause 4.29	The tested resistor be immersed into isopropyl alcohol of 20~25°C for 60 secs. Then the resistor is left in the room for 48 hrs.	1% : ±(0.5%+0.05Ω) 5% : ±(0.5%+0.05Ω)
Load Life in Humidity	JIS C 5201-1 clause 4.24	40±2°C, 90~95% R.H. RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF" .	1% : ±(1.0%+0.05Ω) 5% : ±(2.0%+0.05Ω)
Load Life (Endurance)	JIS C 5201-1 clause 4.25	70±2°C, RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF" .	1% : ±(1.0%+0.05Ω) 5% : ±(3.0%+0.10Ω)
Insulation Resistance	JIS C 5201-1 clause 4.6	100V for 1 minute.	≥ 10GΩ
Terminal Bending Strength	JIS C 5201-1 clause 4.33	Bending once for 5 seconds D : 0402、0603、0805=5mm 1206、1210、1812=3mm 2010、2512、1218 =2mm	1% : ±(1.0%+0.05Ω) 5% : ±(1.0%+0.05Ω)



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AEC-Q200 test

Test Item	Test Method	Procedure	Requirements
Temperature Cycling	JESD22 Method JA-104	1000 Cycles (-55°C to +125°C) Measurement at 24± 4 hours after test conclusion.	1% : ±(0.5%+0.05 Ω) 5% : ±(1.0%+0.10 Ω)
Resistance to Solvent	MIL-STD-202 Method 215	Add Aqueous wash chemical-OKEM clean or equivalent.	1% : ±(0.5%+0.05 Ω) 5% : ±(0.5%+0.05 Ω)
Biased Humidity	MIL-STD-202 Method 103	1000 hours 85°C/85%RH. 10% of operation power.	1% : ±(1.0%+0.05 Ω) 5% : ±(3.0%+0.05 Ω)
High Temperature Exposure (Storage)	MIL-STD-202 Method 108	1000 hrs. T=125°C.	1% : ±(0.5%+0.05 Ω) 5% : ±(2.0%+0.05 Ω)
Operation Life	MIL-STD-202 Method 108	125°C RCWV or Max.working voltage whichever is less for 1000 hrs with 1.5 hrs"ON" and 0.5hr "OFF" Please refer to the Power Derating Curve .	1% : ±(1.0%+0.05 Ω) 5% : ±(3.0%+0.10 Ω)
External Visual	MIL-STD-883 Method 2009	Electrical test not required. Inspect device construction, marking and workmanship.	—
Mechanical Shock	MIL-STD-202 Method 213	Impact acceleration : 1500g Pulse duration : 0.5ms Number of shocks : 30 shocks(5 shocks for each face)	1% : ±(1.0%+0.05 Ω) 5% : ±(2.0%+0.1 Ω)
Vibration	MIL-STD-202 Method 204	5 g's for 20min., 12 cycles each of 3 orientations.	1% : ±(1.0%+0.05 Ω) 5% : ±(2.0%+0.1 Ω)
ESD	AEC-Q200- 002 or ISO/DIS 10605	0402 / 0603 : 1KV 0805 and above : 2KV	For the product %
Solderability	J-STD-002	(1) 4 hrs 155°C dry heat (2) 260±5°C 10 sec.	1% : ±(0.5%+0.05 Ω) 5% : ±(1.0%+0.05 Ω)
Terminal Strength (SMD)	AEC Q200-006	0402 / 0603 : 8N 0805 and above : 17.7N	No broken
Board Flex	AEC Q200-005	Beading once for 60 seconds	1% : ±(1.0%+0.05 Ω) 5% : ±(1.0%+0.05 Ω)

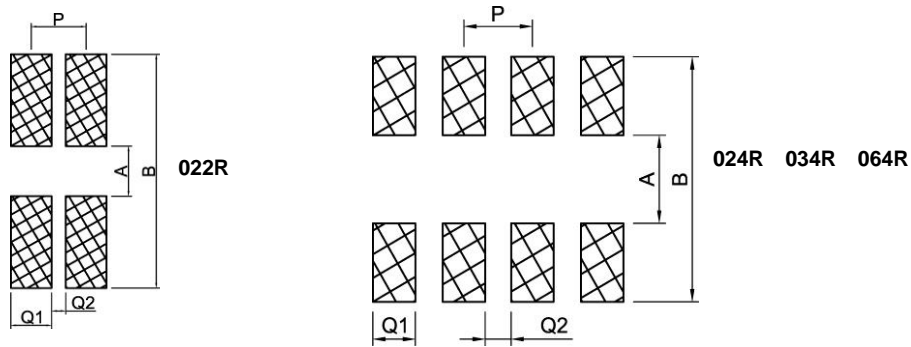


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● General Information

■ Recommend Land Pattern Design (For Reflow Soldering)



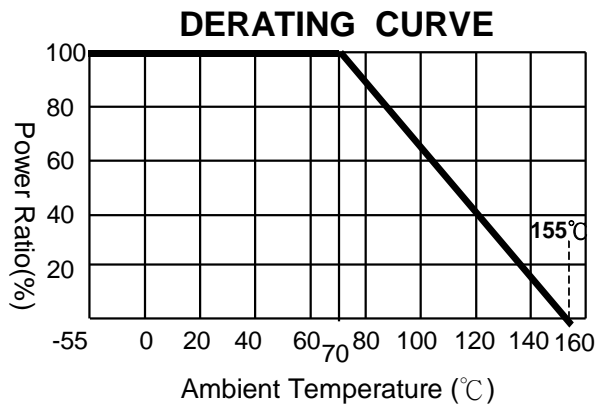
■ Dimension

Unit: mm

Type	022R	024R	034R	064R
Item				
A	0.50	0.50	1.00	2.00
B	2.00	2.00	2.60	4.75
P	0.67	0.50	0.80	1.30
Q1	0.33	0.28	0.40	0.90
Q2	0.34	0.22	0.40	0.375

■ 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.



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■ 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)

■ Product Testing Method:

Our products are tested with our company's tapping & testing equipments by using four-foot 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.

■ Standard Resistance Values in a Decade

Marking code:

- 5%: marking code, please refer to E24 data
Ex: 120K, The marking code is 124 in E24
- Note: Array resistors 1%&5% code is the same.
- Note: jumper zero ohm resistor marking code is one 「0」 (except type below 022R).

E192	E96	E48	E192	E96	E48	E192	E96	E48	E192	E96	E48	E192	E96	E48
100	100	100	169	169	169	287	287	287	487	487	487	825	825	825
101			172			291			493			835		
102	102		174	174		294	294		499	499		845	845	
104			176			298			505			856		
105	105	105	178	178	178	301	301	301	511	511	511	866	866	866
106			180			305			517			876		
107	107		182	182		309	309		523	523		887	887	
109			184			312			530			898		
110	110	110	187	187	187	316	316	316	536	536	536	909	909	909
111			189			320			542			920		
113	113		191	191		324	324		549	549		931	931	
114			193			328			556			942		
115	115	115	196	196	196	332	332	332	562	562	562	953	953	953
117			198			336			569			965		
118	118		200	200		340	340		576	576		976	976	
120			203			344			583			988		
121	121	121	205	205	205	348	348	348	590	590	590			
123			208			352			597					
124	124		210	210		357	357		604	604				

E24 E12 E6 E3



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126		213		361		612		10	10	10	10
127	127	215	215	365	365	619	619	11			
129		218		370		626		12	12		
130	130	221	221	374	374	634	634	13			
132		223		379		642		15	15	15	
133	133	226	226	383	383	649	649	16			
135		229		388		657		18	18		
137	137	232	232	392	392	665	665	20			
138		234		397		673		22	22	22	22
140	140	237	237	402	402	681	681	24			
142		240		407		690		27	27		
143	143	243	243	412	412	698	698	30			
145		246		417		706		33	33	33	
147	147	249	249	422	422	715	715	36			
149		252		427		723		39	39		
150	150	255	255	432	432	732	732	43			
152		258		437		741		47	47	47	47
154	154	261	261	442	442	750	750	51			
156		264		448		759		56	56		
158	158	267	267	453	453	768	768	62			
160		271		459		777		68	68	68	
162	162	274	274	464	464	787	787	75			
164		277		470		796		82	82		
165	165	280	280	475	475	806	806	91			
167		284		481		816					

According to IEC publication 63