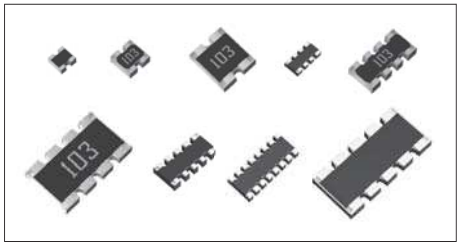
Chip Resistor Networks

MNR Series < General Purpose >

●Features

1) Can be mounted even more densely than chip resistors.
2) Mounting cost can be reduced by less frequency of mounting times.
3) Convex electrodes secures visual inspection of fillets after soldering.
4) ROHM resistors have obtained ISO9001 / ISO / TS16949 certification.
5) "Automotive" product is AEC-Q200 compliant.



Part No.	Size		No. of terminals	No. of elements	Type Code		Packing Specification	Quantity / Reel
	(mm)	(inch)			GENERAL PURPOSE	AUTOMOTIVE ∗Corresponds to AEC–Q200		
MNR02	1005 × 2	0402 × 2	4	2	MRAP	M0AP	Paper tape (2mm Pitch)	10,000
MNR04	1005 × 4	0402 × 4	8	4	MRAP	M0AP		
MNR12	1608 × 2	0603 × 2	4	2	ERAP	E0AP	Paper tape (4mm Pitch)	5,000
MNR14	1608 × 4	0603 × 4	8	4	ERAP	E0AP		
MNR15	1608 × 5	0603 × 5	10	8	ERRP	E0RP		
MNR18	1605 × 8	0602 × 8	16	8	ERAP	E0AP		
MNR32	3216 × 2	1206 × 2	4	2	J0AB		Embossed tape (4mm Pitch)	4,000
MNR34	3216 × 4	1206 × 4	8	4	J5AB			
MNR35	3216 × 5	1206 × 5	10	8	J5R			

∗Please contact us for status of AEC-Q200 on "General purpose" products.

●Part Number Description

M N R — **Part No.**
MNR (Chip Resistor Networks)

0 2 — **Size** (mm [inch])
02 (1005 [0402] × 2)
04 (1005 [0402] × 4)
12 (1608 [0603] × 2)
14 (1608 [0603] × 4)
15 (1608 [0603] × 5)
18 (1605 [0602] × 8)
32 (3216 [1206] × 2)
34 (3216 [1206] × 4)
35 (3216 [1206] × 5)

M 0 A P — **Type Code**

J — **Resistance Tolerance**
F (±1%)
J (±5%)(Including jumper type)

1 0 5 — **Nominal Resistance**
Resistance code, 3 or 4 digits.
000 denotes jumper type.

Resistance tolerance		Resistance code
F	:	4 digits
J	:	3 digits

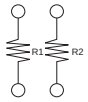
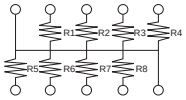
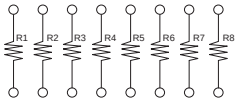
Ex.)
1Ω = 1R0 (±5%)
9.1Ω = 9R1 (±5%)
10Ω = 10R0 (±1%)
100 (±5%)
1MΩ = 1004 (±1%)
105 (±5%)

●Products List

Part No.	Type Code	Rated Power (70°C) (W)	Limiting Element Voltage (V)	Maximum Overload Voltage (V)	Temperature Coefficient (ppm / °C)	Resistance Tolerance (%)	Resistance Range	Series	Operating Temperature Range (°C)
MNR02	MRAP	0.063 / Element	25	–	±200	J(±5%)	10Ω to 1MΩ	E24	–55 to +155
		Jumper type : Rmax = 50mΩ / Imax. = 1A (Element)							
MNR04	MRAP	0.063 / Element	25	50	+500/–300	J(±5%)	1Ω to 9.1Ω	E24	
					±200		10Ω to 910k		
		Jumper type : Rmax = 50mΩ / Imax. = 1A (Element)							
MNR12	ERAP	0.063 / Element	50	–	±200	J(±5%)	10Ω to 1MΩ	E24	
					±200	F(±1%)	10Ω to 1MΩ		
		Jumper type : Rmax = 50mΩ / Imax. = 1A (Element)							
MNR14	ERAP	0.063 / Element	50	–	±500	J(±5%)	2.2Ω to 6.8Ω	E6	
					±200		10Ω to 1MΩ	E24	
					±200	F(±1%)	10Ω to 1MΩ		
		Jumper type : Rmax = 50mΩ / Imax. = 1A (Element)							
MNR15	ERRP	0.031 / Element	12.5	–	±200	J(±5%)	56Ω to 100kΩ	E24	–55 to +125
MNR18	ERAP	0.063 / Element	25	–	±250	J(±5%)	10Ω to 1MΩ	E24	
		Jumper type : Rmax = 50mΩ / Imax. = 1A (Element)							
MNR32	J0AB	0.125 / Element	200	400	±200	J(±5%)	10Ω to 1MΩ	E24	
		Jumper type : Rmax = 50mΩ / Imax. = 2A (Element)							
MNR34	J5AB	0.125 / Element	200	400	±200	J(±5%)	10Ω to 1MΩ	E24	
		Jumper type : Rmax = 50mΩ / Imax. = 2A (Element)							
MNR35	J5R	0.063 / Element	50	100	±200	J(±5%)	56Ω to 100kΩ	E12	

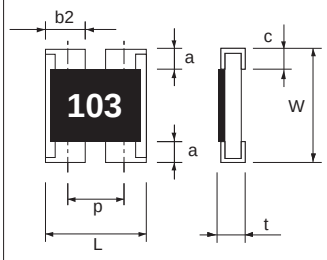
∗Design and specifications are subject to change without notice. Carefully check the specification sheet supplied with the product before using or ordering it.

●Circuit Construction

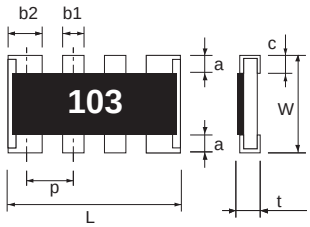
MNR02 / 12 / 32	MNR04 / 14 / 34	MNR15 / 35	MNR18
			
R1=R2	R1=R2=R3=R4	R1=R2=R3=R4=R5=R6=R7=R8	R1=R2=R3=R4=R5=R6=R7=R8

●Chip Resistor Dimensions and Markings

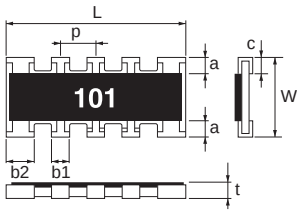
MNR02 / 12 / 32



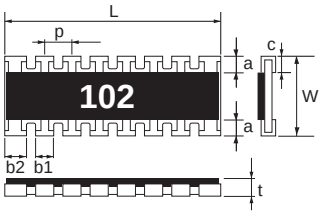
MNR04 / 14 / 34



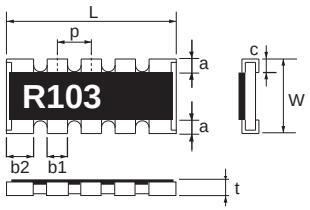
MNR15



MNR18



MNR35



<Marking method>
There are three or four digits used for the calculation number according to IEC code and “R”is used for the decimal point.
MNR35 is「R」+ three digits used for the calculation number according to IEC code.

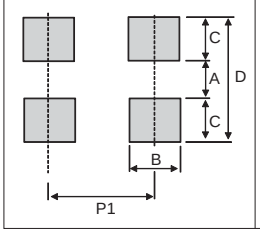
(Unit : mm)

Part No.	Type Code	(mm)	(inch)	L	W	t	a	b1	b2	c	p	Marking existence *Including jumper type
MNR02	MRAP	1005 × 2	0402 × 2	1.0±0.1	1.0±0.1	0.3±0.1	0.15±0.1	–	0.33±0.1	0.25±0.1	0.67	No
MNR04	MRAP	1005 × 4	0402 × 4	2.0±0.1	1.0±0.1	0.4±0.1	0.2±0.1	0.3±0.1	–	0.25±0.2	0.5	Yes
MNR12	ERAP	1608 × 2	0603 × 2	1.6±0.15	1.6±0.15	0.45±0.1	0.3±0.2	–	0.6±0.15	0.3±0.2	0.8	Yes
MNR14	ERAP	1608 × 4	0603 × 4	3.2±0.2	1.6±0.15	0.5±0.1	0.3±0.2	0.5±0.15	–	0.3±0.2	0.8	Yes
MNR15	ERRP	1608 × 5	0603 × 5	3.2±0.2	1.6±0.15	0.55±0.1	0.3±0.15	0.32±0.15	–	0.3±0.15	0.64	Yes
MNR18	ERAP	1605 × 8	0602 × 8	4.0±0.2	1.6±0.1	0.4±0.1	0.3±0.2	0.25±0.1	–	0.3±0.2	0.5	Yes
MNR32	J0AB	3216 × 2	1206 × 2	2.6±0.2	3.1±0.2	0.55±0.1	0.5±0.3	–	1.0±0.2	0.5Max	1.27	Yes
MNR34	J5AB	3216 × 4	1206 × 4	5.2±0.4	3.1±0.2	0.55±0.1	0.5±0.3	0.8±0.2	1.0±0.2	0.5Max	1.27	Yes
MNR35	J5R	3216 × 5	1206 × 5	6.4±0.4	3.1±0.2	0.55±0.1	0.5±0.3	0.8±0.2	1.0±0.2	0.5Max	1.27	Yes

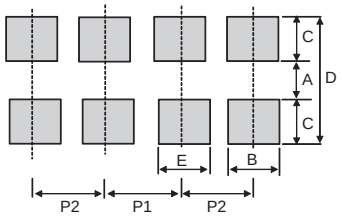
●Land pattern Example

··· Land

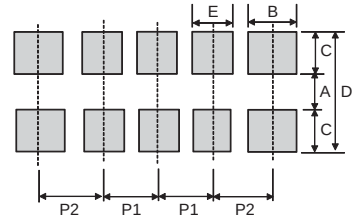
MNR02 / 12 / 32



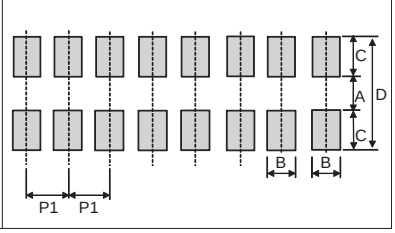
MNR04 / 14 / 34



MNR15 / 35



MNR18



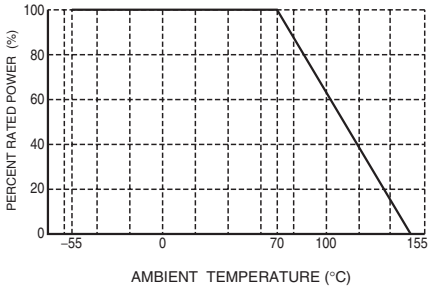
(Unit : mm)

Part No. \ Dimensions	Type Code	A	B	C	D	E	P1	P2
MNR02	MRAP	0.5	0.35 to 0.4	0.5	1.5	–	0.65 to 0.7	–
MNR04	MRAP	0.5	0.4	0.5	1.5	0.3	0.5	0.5 to 0.55
MNR12	ERAP	1.0	0.4 to 0.6	0.7 to 0.8	2.4 to 2.6	–	0.8 to 1.0	–
MNR14	ERAP	1.0	0.4 to 0.6	0.7 to 0.8	2.4 to 2.6	0.4	0.8	0.8 to 0.9
MNR15	ERRP	1.0	0.48	0.7 to 0.8	2.4 to 2.6	0.32	0.64	0.72
MNR18	ERAP	1.0	0.3	0.7 to 0.8	2.4 to 2.6	–	0.5	–
MNR32	J0AB	2.1	0.8 to 1.0	0.8 to 1.0	3.7 to 4.1	–	1.27 to 1.6	–
MNR34	J5AB	2.1	0.8 to 1.0	0.8 to 1.0	3.7 to 4.1	0.7 to 0.8	1.27 to 1.35	1.27 to 1.45
MNR35	J5R	2.1	0.8 to 1.0	0.8 to 1.0	3.7 to 4.1	0.7 to 0.8	1.27 to 1.3	1.27 to 1.4

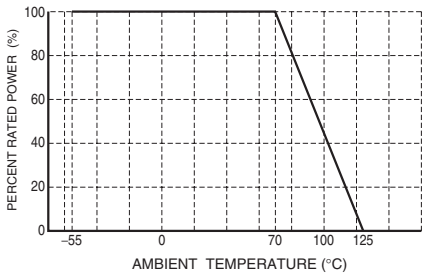
●Derating Curve

When the ambient temperature exceeds 70°C, power dissipation must be adjusted according to the derating curves below.

■ MNR02 / 04 / 12 / 14



■ MNR15 / 18 / 32 / 34 / 35



●Characteristics

Test Items	Guaranteed Value		Test Conditions
	Resistor Type	Jumper Type	
Resistance	See "Products List"		20°C
Variation of resistance with temperature	See "Products List"		Measurement : +20 / –55 / +20 / +125°C
Overload	± (2.0%+0.1Ω)	Max. 50mΩ	Rated voltage (current) ×2.5, 2s. Maximum overload voltage
Solderability	A new uniform coating of minimum of 95% of the surface being immersed and no soldering damage.		Rosin·Ethanol : 25% (weight) Soldering condition : 235±5°C Duration of immersion : 2.0±0.5s
Resistance to soldering heat	± (1.0%+0.05Ω) ± (1.0%+0.1Ω)※MNR35	Max. 50mΩ	Soldering condition : 260±5°C Duration of immersion : 10±1s
	No remarkable abnormality on the appearance.		
Rapid change of temperature	± (1.0%+0.05Ω) ± (1.0%+0.1Ω)※MNR35	Max. 50mΩ	Test temp. : –55°C to +125°C 5cycle
Damp heat, steady state	± (3.0%+0.1Ω)	Max. 100mΩ	40°C, 93%RH (Relative Humidity) Test time : 1,000h to 1,048h
Endurance at 70°C	± (3.0%+0.1Ω)	Max. 100mΩ	70°C Rated voltage (current) 1.5h : ON – 0.5h : OFF Test time : 1,000h to 1,048h
Endurance	± (3.0%+0.1Ω)	Max. 100mΩ	125°C (MNR15 / 18 / 32 / 34 / 35) 155°C (MNR02 / 04 / 12 / 14) Test time : 1,000h to 1,048h
Resistance to solvent	± (1.0%+0.05Ω) ± (1.0%+0.1Ω)※MNR35	Max. 50mΩ	23±5°C, Immersion cleaning, 5±0.5min Solvent : 2–propanol
Bend strength of the end face plating	± (1.0%+0.05Ω)	Max. 50mΩ	–
	Without mechanical damage such as breaks.		

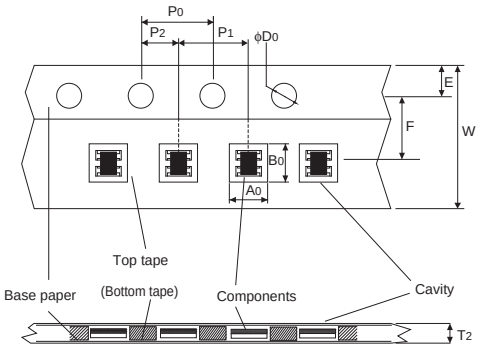
Compliance Standard(s) : IEC60115–8
JISC 5201–8

●Chip weight (typical value)

Parameter	Unit	MNR02 MRAP	MNR04 MRAP	MNR12 ERAP	MNR14 ERAP	MNR15 ERRP	MNR18 ERAP	MNR32 J0AB	MNR34 J5AB	MNR35 J5R
Weight	mg/pc	1.05	2.73	3.75	8.20	8.04	8.74	15.9	31.2	38.4

●Tape Dimensions

■ Paper Tape

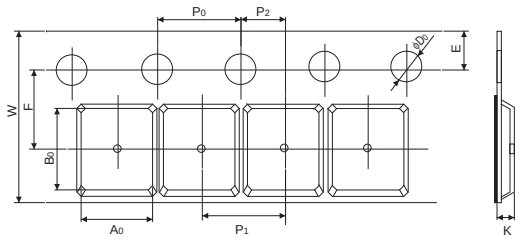


(Unit : mm)

Part No.	Type Code	W	F	E	A0	B0
MNR02	MRAP	8.0±0.3	3.5±0.05	1.75±0.1	1.2±0.1	1.2±0.1
MNR04	MRAP	8.0±0.3	3.5±0.05	1.75±0.1	1.2±0.1	2.2±0.1
MNR12	ERAP	8.0±0.3	3.5±0.05	1.75±0.1	1.9±0.1	1.9±0.1
MNR14	ERAP	8.0±0.3	3.5±0.05	1.75±0.1	1.9±0.1	3.45±0.1
MNR15	ERRP	8.0±0.3	3.5±0.05	1.75±0.1	1.9±0.1	3.5±0.2
MNR18	ERAP	12.0±0.2	5.5±0.05	1.75±0.1	1.9±0.2	4.3±0.2

Part No.	Type Code	D0	P0	P1	P2	T2
MNR02	MRAP	$\phi 1.5^{+0.1}_{0}$	4.0±0.1	2.0±0.1	2.0±0.05	Max 0.5
MNR04	MRAP	$\phi 1.5^{+0.1}_{0}$	4.0±0.1	2.0±0.1	2.0±0.05	Max 1.1
MNR12	ERAP	$\phi 1.5^{+0.1}_{0}$	4.0±0.1	4.0±0.1	2.0±0.05	Max 1.1
MNR14	ERAP	$\phi 1.5^{+0.1}_{0}$	4.0±0.1	4.0±0.1	2.0±0.05	Max 1.1
MNR15	ERRP	$\phi 1.5^{+0.1}_{0}$	4.0±0.1	4.0±0.1	2.0±0.05	Max 1.1
MNR18	ERAP	$\phi 1.5^{+0.1}_{0}$	4.0±0.1	4.0±0.1	2.0±0.05	Max 1.1

■ Embossed Tape



(Unit : mm)

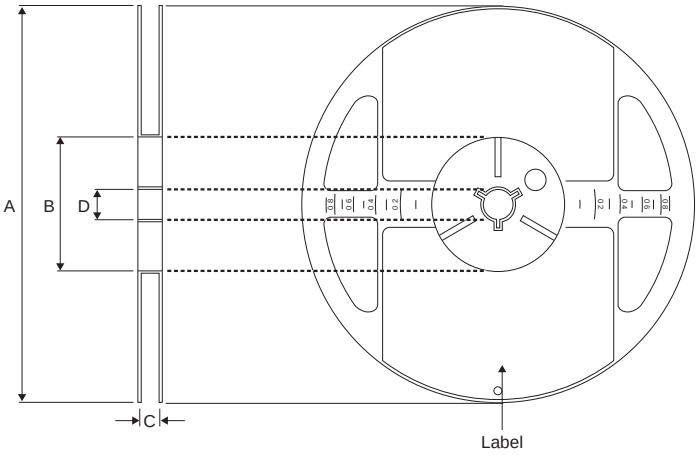
Part No.	Type Code	W	F	E	A0	B0
MNR32	J0AB	8.0±0.3	3.5±0.05	1.75±0.1	3.0±0.1	3.5±0.1
MNR34	J5AB	12.0±0.3	5.5±0.05	1.75±0.1	3.4±0.1	5.6±0.1
MNR35	J5R	12.0±0.3	5.5±0.05	1.75±0.1	3.4±0.1	6.6±0.1

Part No.	Type Code	D0	P0	P1	P2	K
MNR32	J0AB	$\phi 1.5^{+0.1}_{0}$	4.0±0.1	4.0±0.1	2.0±0.05	0.9±0.1
MNR34	J5AB	$\phi 1.5^{+0.1}_{0}$	4.0±0.1	4.0±0.1	2.0±0.05	1.0±0.15
MNR35	J5R	$\phi 1.5^{+0.1}_{0}$	4.0±0.1	4.0±0.1	2.0±0.05	1.0±0.15

●Reel Dimensions

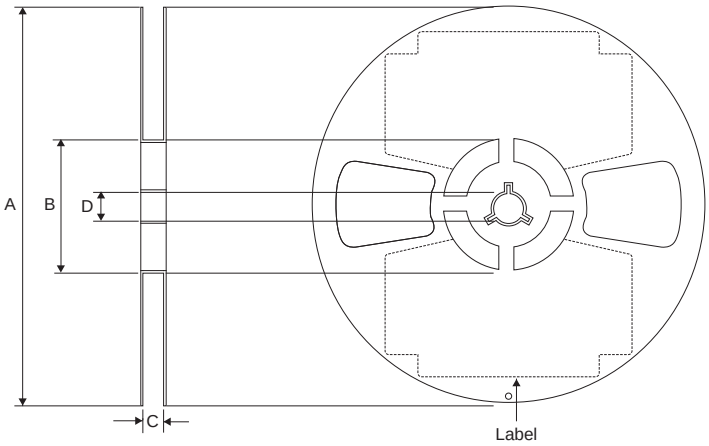
(MNR32 using Fig.1 or Fig.2 reel for taping. Other series applies Fig.1 only.)

■ Fig.1 (MNR02 / 04 / 12 / 14 / 15 / 18 / 32 / 34 / 35)



According to EIAJ ET-7200B (RRM)

■ Fig.2 (MNR32)



According to EIAJ ET-7200B (RRV)

(Unit : mm)

Part No.	Type Code	A	B	C	D
MNR02	MRAP	ϕ178±2.0	ϕ60±1.0	9.0±0.5	ϕ13.5±0.5
MNR04	MRAP				
MNR12	ERAP				
MNR14	ERAP				
MNR15	ERRP				
MNR18	ERAP		ϕ80±1.0	13.8±0.5	
MNR32	J0AB	ϕ180 $^{0}_{-1.5}$	ϕ60 $^{+1.0}_{0}$	9 $^{+1.0}_{0}$	ϕ13±0.2
MNR34	J5AB			13 $^{+1.0}_{0}$	
MNR35	J5R				

Notes

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Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

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ROHM SEMICONDUCTOR

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More detail product informations and catalogs are available, please contact us.

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