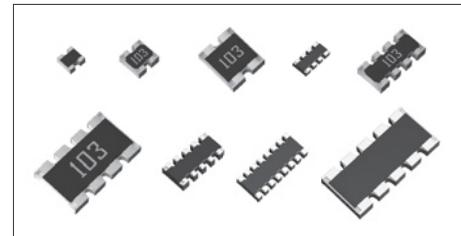


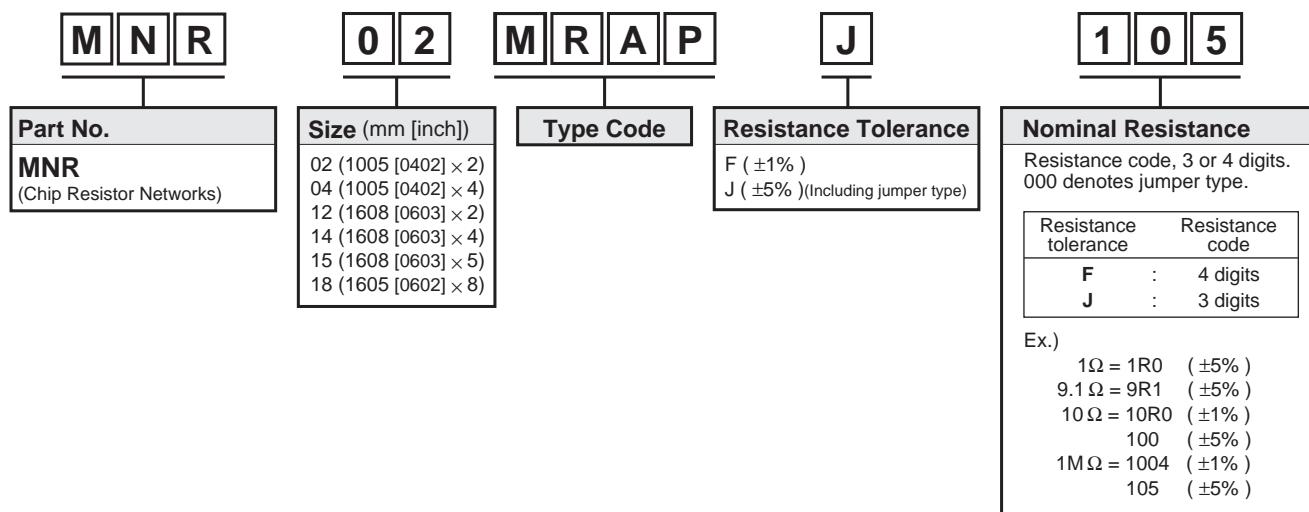
## ●Features

- 1) Can be mounted even more densely than chip resistors.
- 2) Convex electrodes secures visual inspection of fillets after soldering.
- 3) ROHM resistors have obtained ISO9001 / ISO / TS16949 certification.



Part No.	Size		No. of terminals	No. of elements	Type Code	Packing Specification	Quantity / Reel
	(mm)	(inch)					
<b>MNR02</b>	1005 × 2	0402 × 2	4	2	MRAP	Paper tape (2mm Pitch)	10,000
<b>MNR04</b>	1005 × 4	0402 × 4	8	4	MRAP		
<b>MNR12</b>	1608 × 2	0603 × 2	4	2	ERAP	Paper tape (4mm Pitch)	5,000
<b>MNR14</b>	1608 × 4	0603 × 4	8	4	ERAP		
<b>MNR15</b>	1608 × 5	0603 × 5	10	8	ERRP		
<b>MNR18</b>	1605 × 8	0602 × 8	16	8	ERAP		

## ●Part Number Description

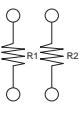
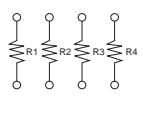
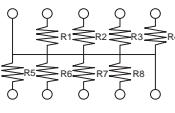
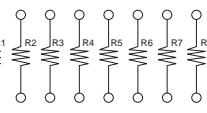


## ●Products List

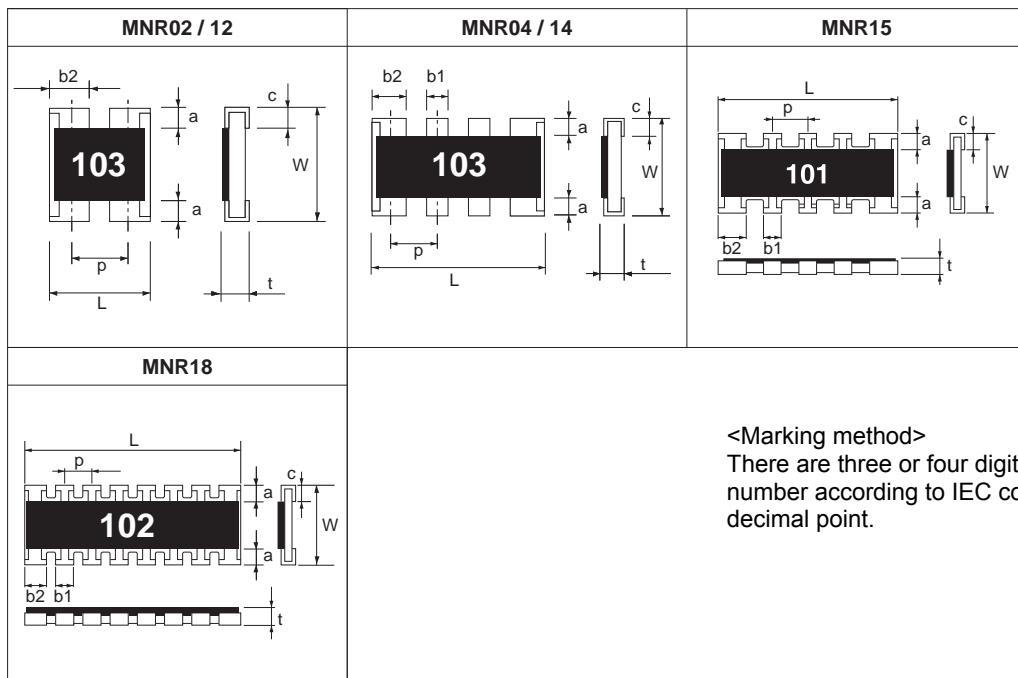
Part No.	Type Code	Rated Power (70°C) (W)	Limiting Element Voltage (V)	Maximum Overload Voltage (V)	Temperature Coefficient (ppm / °C)	Resistance Tolerance (%)	Resistance Range	Series	Operating Temperature Range (°C)	
MNR02	MRAP	0.063 / Element	25	–	±200	J(±5%)	10Ω to 1MΩ	E24	–55 to +155	
							Jumper type : Rmax = 50mΩ / Imax. = 1A (Element)			
MNR04	MRAP	0.063 / Element	25	50	+500/-300	J(±5%)	1Ω to 9.1Ω	E24	–55 to +155	
					±200		10Ω to 910k			
Jumper type : Rmax = 50mΩ / Imax. = 1A (Element)										
MNR12	ERAP	0.063 / Element	50	–	±200	J(±5%)	10Ω to 1MΩ	E24	–55 to +155	
					±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	–55 to +125	
					±200		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)					

\*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	MNR04 / 14	MNR15	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



### <Marking method>

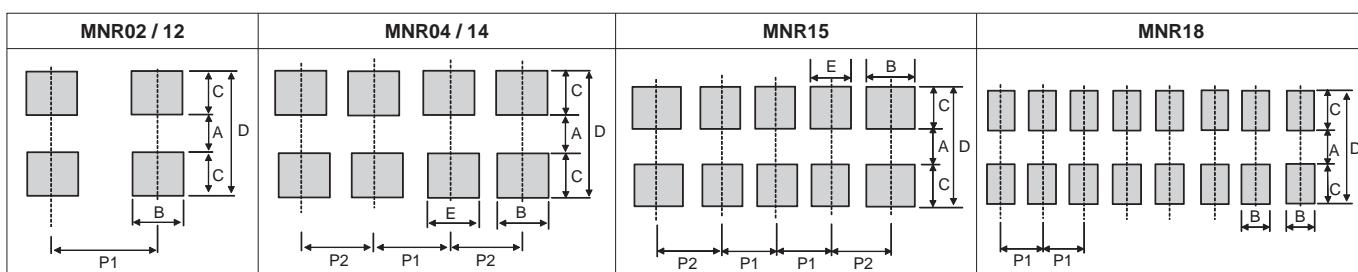
There are three or four digits used for the calculation number according to IEC code and "R" is used for the decimal point.

(Unit : mm)

Part No.	Type Code	(mm)	(inch)	L	W	t	a	b1	b2	c	p	Marking existence *Including jumper type
<b>MNR02</b>	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
<b>MNR04</b>	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
<b>MNR12</b>	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
<b>MNR14</b>	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
<b>MNR15</b>	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
<b>MNR18</b>	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

## ● Land pattern Example

[■] ... Land



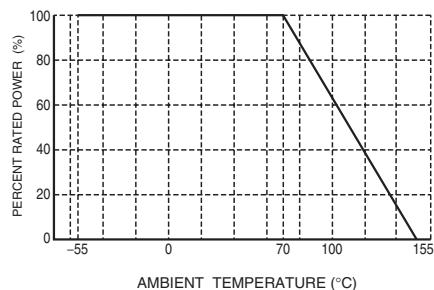
(Unit : mm)

Dimensions Part No.	Type Code	A	B	C	D	E	P1	P2
<b>MNR02</b>	MRAP	0.5	0.35 to 0.4	0.5	1.5	—	0.65 to 0.7	—
<b>MNR04</b>	MRAP	0.5	0.4	0.5	1.5	0.3	0.5	0.5 to 0.55
<b>MNR12</b>	ERAP	1.0	0.4 to 0.6	0.7 to 0.8	2.4 to 2.6	—	0.8 to 1.0	—
<b>MNR14</b>	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
<b>MNR15</b>	ERRP	1.0	0.48	0.7 to 0.8	2.4 to 2.6	0.32	0.64	0.72
<b>MNR18</b>	ERAP	1.0	0.3	0.7 to 0.8	2.4 to 2.6	—	0.5	—

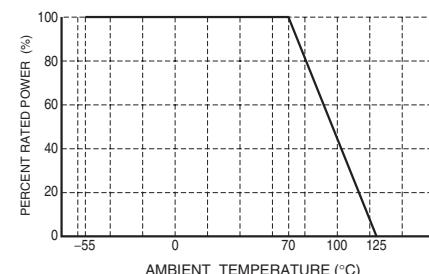
## ●Derating Curve

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

■ MNR02 / 04 / 12 / 14



■ MNR15 / 18



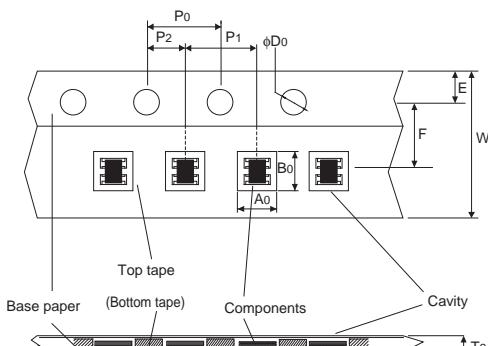
## ●Characteristics

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)	Max. 50mΩ	Soldering condition : 260±5°C Duration of immersion : 10±1s
Rapid change of temperature	± (1.0%+0.05Ω)	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) 155°C (MNR02 / 04 / 12 / 14) Test time : 1,000h to 1,048h
Resistance to solvent	± (1.0%+0.05Ω)	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

## ● Tape Dimensions

### ■ Paper Tape

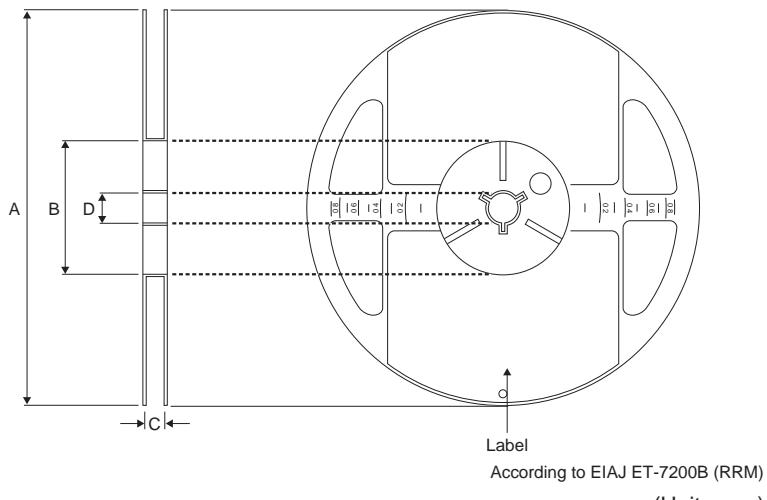


Part No.	Type Code	W	F	E	$A_0$	$B_0$	(Unit : mm)
<b>MNR02</b>	MRAP	$8.0 \pm 0.3$	$3.5 \pm 0.05$	$1.75 \pm 0.1$	$1.2 \pm 0.1$	$1.2 \pm 0.1$	
<b>MNR04</b>	MRAP	$8.0 \pm 0.3$	$3.5 \pm 0.05$	$1.75 \pm 0.1$	$1.2 \pm 0.1$	$2.2 \pm 0.1$	
<b>MNR12</b>	ERAP	$8.0 \pm 0.3$	$3.5 \pm 0.05$	$1.75 \pm 0.1$	$1.9 \pm 0.1$	$1.9 \pm 0.1$	
<b>MNR14</b>	ERAP	$8.0 \pm 0.3$	$3.5 \pm 0.05$	$1.75 \pm 0.1$	$1.9 \pm 0.1$	$3.45 \pm 0.1$	
<b>MNR15</b>	ERRP	$8.0 \pm 0.3$	$3.5 \pm 0.05$	$1.75 \pm 0.1$	$1.9 \pm 0.1$	$3.5 \pm 0.2$	
<b>MNR18</b>	ERAP	$12.0 \pm 0.2$	$5.5 \pm 0.05$	$1.75 \pm 0.1$	$1.9 \pm 0.2$	$4.3 \pm 0.2$	

Part No.	Type Code	$D_0$	$P_0$	$P_1$	$P_2$	$T_2$
<b>MNR02</b>	MRAP	$\phi 1.5^{+0.1}_0$	$4.0 \pm 0.1$	$2.0 \pm 0.1$	$2.0 \pm 0.05$	Max 0.5
<b>MNR04</b>	MRAP	$\phi 1.5^{+0.1}_0$	$4.0 \pm 0.1$	$2.0 \pm 0.1$	$2.0 \pm 0.05$	Max 1.1
<b>MNR12</b>	ERAP	$\phi 1.5^{+0.1}_0$	$4.0 \pm 0.1$	$4.0 \pm 0.1$	$2.0 \pm 0.05$	Max 1.1
<b>MNR14</b>	ERAP	$\phi 1.5^{+0.1}_0$	$4.0 \pm 0.1$	$4.0 \pm 0.1$	$2.0 \pm 0.05$	Max 1.1
<b>MNR15</b>	ERRP	$\phi 1.5^{+0.1}_0$	$4.0 \pm 0.1$	$4.0 \pm 0.1$	$2.0 \pm 0.05$	Max 1.1
<b>MNR18</b>	ERAP	$\phi 1.5^{+0.1}_0$	$4.0 \pm 0.1$	$4.0 \pm 0.1$	$2.0 \pm 0.05$	Max 1.1

## ● Reel Dimensions

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



According to EIAJ ET-7200B (RRM)

(Unit : mm)

Part No.	Type Code	A	B	C	D
<b>MNR02</b>	MRAP				
<b>MNR04</b>	MRAP				
<b>MNR12</b>	ERAP				
<b>MNR14</b>	ERAP				
<b>MNR15</b>	ERRP				
<b>MNR18</b>	ERAP				

## Notes

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- 2) Before you use our Products, please contact our sales representative and verify the latest specifications :
- 3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors. Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. ROHM shall have no responsibility for any damages arising out of the use of our Products beyond the rating specified by ROHM.
- 4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.
- 5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.
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- 7) The Products specified in this document are not designed to be radiation tolerant.
- 8) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.
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