

2010

Product Catalog

**ROHM**  
SEMICONDUCTOR

Passive Components

# Resistors



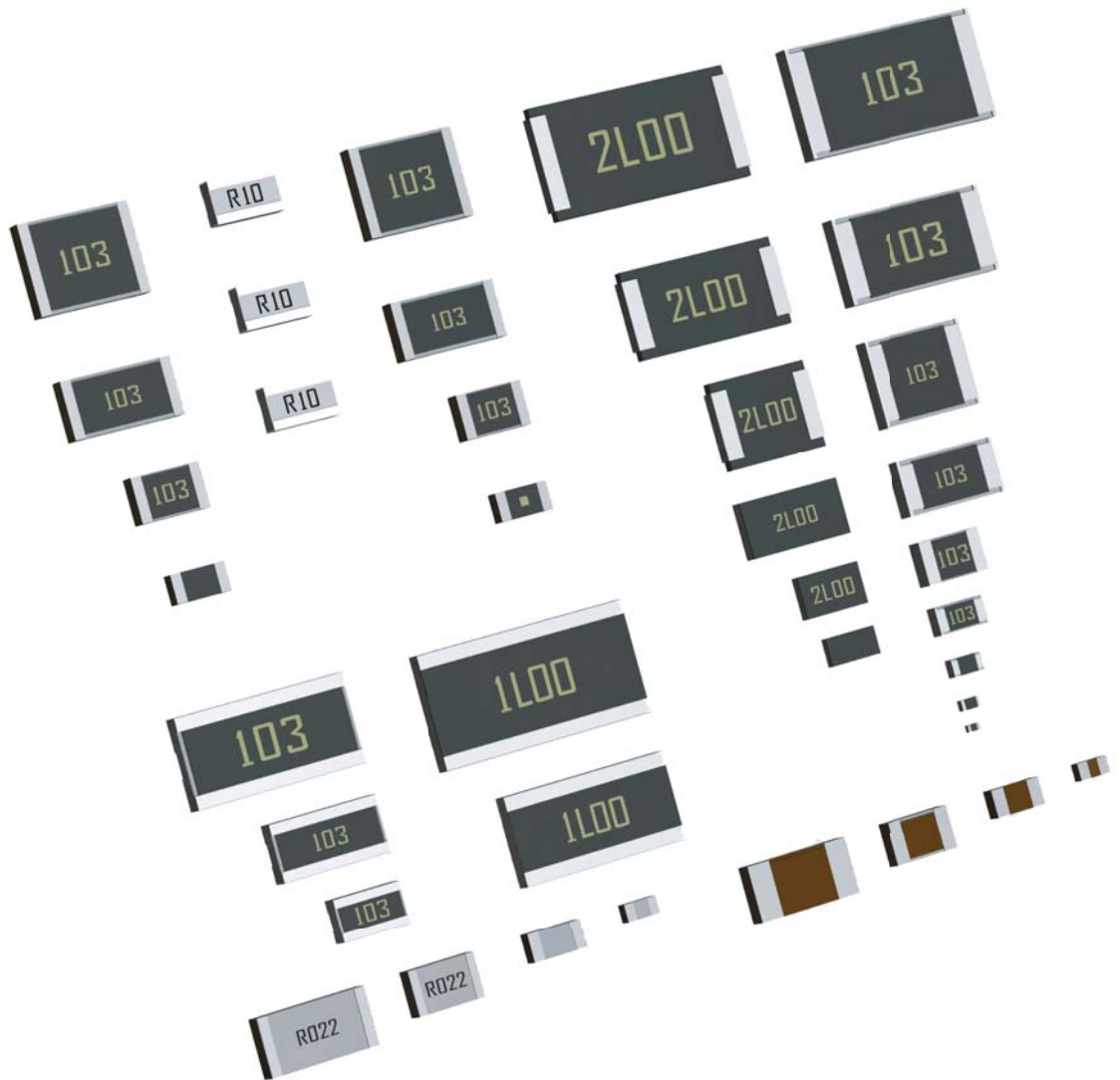
ROHM Co.,Ltd.

# Resistors

ROHM, the pioneer in chip resistors, offers a broad lineup, ranging from the ultra-compact MCR004 series units and the high reliability surge-resistant ESR series to high voltage resistance models (KTR series) and products optimized for current detection (PMR series). Select the ideal solution to fit set requirements.

# EMI Filters

ROHM 1608-sized 3-terminal EMI filters are available in a number of capacitances and are specifically designed for removal of onboard differential mode noise over a wide range of frequencies.







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# Resistor Lineup

Part No.	Size (mm(inch))	Circuit	Rated power (W)	Tolerance	Temperature coefficient (ppm/°C)	Resistance range (Ω)	Operating temperature range (°C)	
<b>Compact Thick Film Chip Resistors &lt;MCR Series&gt;</b>								
<b>New</b> MCR004	0402(01005)		1/32 (0.031)	J(±5%) F(±1%)	±250	10 to 3M		
MCR006	0603(0201)		1/20 (0.05)	J(±5%) F(±1%) D(±0.5%)	+600/-200/±250* ±250 ±200/±100*	1 to 10M 10 to 10M 10 to 1M		
MCR01	1005(0402)		1/16 (0.063)	J(±5%) F(±1%) D(±0.5%)	+500/-250/±200* ±100 ±100/±50*	1 to 10M 10 to 2.2M 10 to 1M	-55 to +125	
MCR03	1608(0603)		1/10 (0.1)	J(±5%) FX(±1%) D(±0.5%)	±400/±200* ±100 ±100/±50*	1 to 10M 10 to 10M 10 to 1M		
MCR10	2012(0805)		1/8 (0.125)	J(±5%) F(±1%)	±400/±200* ±100	1 to 10M 10 to 2.2M		
			1/10(0.1)	D(±0.5%)	±100/±50*	10 to 1M	-55 to +155	
<b>Thick Film Chip Resistors &lt;MCR Series&gt;</b>								
MCR18	3216(1206)			1/4 (0.25)	J(±5%) F(±1%)	±400/±200* ±100	1 to 10M 10 to 2.2M	
MCR25	3225(1210)			1/8(0.125)	D(±0.5%)	±100/±50*	10 to 1M	-55 to +155
MCR50	5025(2010)			1/4 (0.25)	J(±5%) F(±1%)	500±350/±500/±200* ±100	1 to 3.3M 10 to 1M	
MCR100	6432(2512)	1/2 (0.5)		J(±5%) F(±1%)	500±350/±500/±200/±350* ±100	1 to 560k 10 to 180k		
		1		J(±5%) F(±1%)	500±350/±500/±350/±200* ±100	1 to 100k 10 to 82k	-55 to +125	
<b>Low Ohmic Thick Film Chip Resistors &lt;MCR Series&gt;</b>								
MCR01	1005(0402)		1/16(0.063)	F(±1%)	±400	1.0 to 9.1		
MCR03	1608(0603)		1/10(0.1)	F(±1%)	±400	1.0 to 9.1		
MCR10	2012(0805)		1/4 (0.25)	J(±5%) F(±1%)	500±300 400±200 ±250	0.047 to 0.091 0.1 to 0.13 0.15 to 0.91		
MCR18	3216(1206)		1/4 (0.25)	J(±5%) F(±1%)	500±300 400±200 ±250	0.047 to 0.091 0.1 to 0.13 0.15 to 0.91	-55 to +155	
MCR25	3225(1210)		1/2 (0.5)	J(±5%) F(±1%)	300±300 ±200	0.047 to 0.091 0.1 to 0.91		
MCR50	5025(2010)		1/2 (0.5)	J(±5%) F(±1%)	500±300 400±200 ±250	0.047 to 0.091 0.1 to 0.13 0.15 to 9.1		
MCR100	6432(2512)		1	J(±5%) F(±1%)	500±300 400±200 ±250	0.047 to 0.091 0.1 to 0.13 0.15 to 9.1	-55 to +125	
<b>Thick Film Low Ohmic Chip Resistors &lt;UCR Series&gt;</b>								
★ UCR01	1005(0402)			1/8 (0.125)	J(±5%) F(±1%)	0 to 300	68m to 910m	
★ UCR03	1608(0603)			1/4 (0.25)	J(±5%) F(±1%)	0 to 250 / 0 to 200	20m to 91m*	
UCR10	2012(0805)			1/5 (0.20)	J(±5%) F(±1%)	0 to 150	100m to 910m	-55 to +155
UCR18	3216(1206)			1/3 (0.33)	J(±5%) F(±1%)	250±200/0 to 250/0 to 150* 0 to 250/0 to 150*	11m to 100m 20m to 100m	
				1/2 (0.5)	J(±5%) F(±1%)	0 to 350/0 to 200/0 to 150* 0 to 350/0 to 200/0 to 150*	11m to 100m	

★ : Under development

\* : The temperature characteristics will vary depending on the resistance value

Part No.	Size (mm(inch))	Circuit	Rated power (W)	Tolerance	Temperature coefficient (ppm/°C)	Resistance range (Ω)	Operating temperature range (°C)
<b>Ultra-Low Ohmic Chip Resistors for Current Detection &lt;PMR Series&gt;</b>							
PMR03	1608(0603)		1/4 (0.25)	J(±5%) F(±1%)	±150	10m	-55 to +155
PMR10	2012(0805)		1/2 (0.5)	J(±5%) G(±2%) F(±1%)	±150	2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m	
PMR18	3216(1206)		3/4 (0.75)	J(±5%) F(±1%)	±150		
PMR25	3225(1210)		1	J(±5%) F(±1%)	±100	1m, 2m, 3m, 4m, 5m	
PMR50	5025(2010)		1	J(±5%) F(±1%)	±100	1m, 2m, 3m, 4m, 5m,	
PMR100	6432(2512)		2	J(±5%)	±100*	6m, 7m, 8m, 9m, 10m	
				F(±1%)			
<b>Ultra-Low Ohmic Wide Terminal Chip Resistors &lt;PML Series&gt;</b>							
★ PML50	5025(2010)		2	J(±5%)	±200	0.5m, 1m, 1.5m, 2m, 2.2m	-55 to +155
★ PML100	6432(2512)		3	J(±5%)	±200		
<b>High Power Wide Terminal Chip Resistors (Low Ohmic Type) &lt;LTR Series&gt;</b>							
LTR10	2012(0805)		1/2 (0.5)	J(±5%) F(±1%)	±150	47m to 9.1	-55 to +155
<b>High Power Wide Terminal Chip Resistors &lt;LTR Series&gt;</b>							
★ LTR10	2012(0805)		1/4 (0.25)	J(±5%)	±200	1 to 1M	-55 to +155
				F(±1%)	±100	10 to 1M	
				D(±0.5%)			
LTR18	3216(1206)		1/2 (0.5)	J(±5%)	±200	1 to 1M	
				F(±1%)	±100	10 to 1M	
LTR50	5025(2010)		1	J(±5%)		±200	
		F(±1%)		±100	10 to 130k		
			D(±0.5%)				

★ : Under development

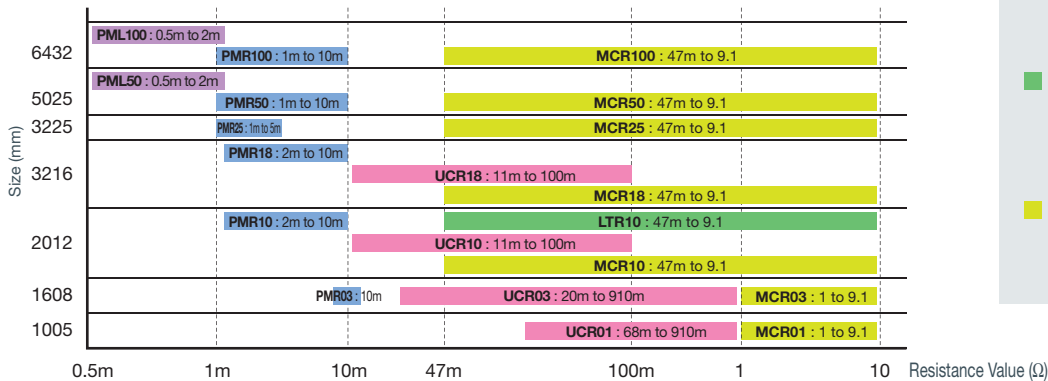
\* : 1mΩ and 2mΩ only : ±150ppm/°C

## Low Ohmic Lineup Distribution Matrix





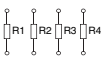



### Rated Power - Size

Rated power (W)	0.063	0.1	0.125	0.2	0.25	0.33	0.5	0.75	1	1.5	2
Size (mm)											
6432											
5025											
3225											
3216											
2012											
1608											
1005											

### Resistance Value - Size (Less than 10Ω)



- Ultra-low Ohmic Chip Resistors for Current Detection  
PMR Series
- Ultra-low Ohmic Wide Terminal Chip Resistors  
PML Series
- Thick Film Low Ohmic Chip Resistors  
UCR Series
- High Power Wide Terminal Chip Resistors (Low Ohmic Type)  
LTR Series
- Standard Chip Resistors (Low Ohmic Type)  
MCR Series

Part No.	Size (mm(inch))	Circuit	Rated power (W)	Temperature coefficient (ppm/°C)	Tolerance	Resistance range (Ω)	Operating temperature range (°C)		
<b>Anti-Surge Chip Resistors &lt;ESR Series&gt;</b>									
ESR03	1608(0603)		1/5 (0.2)	±200	J(±5%)	1 to 10M	-55 to +155		
				±100	F(±1%)				
ESR10	2012(0805)		1/4 (0.25)	±200	J(±5%)	1 to 10M			
				±100	F(±1%)	1 to 10M			
ESR18	3216(1206)		1/3 (0.33)	±200	J(±5%)	1 to 10M			
				±100	F(±1%)	1 to 10M			
ESR25	3225(1210)		1/2 (0.5)	±200	J(±5%)	1 to 10M			
				±100	F(±1%)	1 to 10M			
					±100	D(±0.5%)		10 to 1M	
<b>High Voltage Resistance Chip Resistors &lt;KTR Series&gt;</b>									
KTR03	1608(0603)		1/10 (0.1)	±200	J(±5%)	1 to 10M	-55 to +155		
				±100	F(±1%)				
KTR10	2012(0805)		1/8 (0.125)	±200	J(±5%)	1 to 10M			
				±100	F(±1%)	1 to 10M			
KTR18	3216(1206)		1/4 (0.25)	±200	J(±5%)	1 to 10M			
		±100		F(±1%)	1 to 10M				
KTR25	3225(1210)	1/3 (0.33)	±200	J(±5%)	1 to 10M				
			±100	F(±1%)	1 to 10M				
<b>Sulfuration-Resistant Chip Resistors &lt;TRR Series&gt;</b>									
TRR01	1005(0402)		1/16 (0.063)	+500/-250/±200 *	J(±5%)	1 to 10M	-55 to +155		
				±100	F(±1%)	10 to 2.2M			
TRR03	1608(0603)		1/10 (0.1)	±400/±200 *	J(±5%)	1 to 10M			
				±100	F(±1%)	10 to 10M			
TRR10	2012(0805)		1/8 (0.125)	±400/±200 *	J(±5%)	1 to 10M			
		±100		F(±1%)	10 to 2.2M				
TRR18	3216(1206)	1/4 (0.25)	±400/±200 *	J(±5%)	1 to 10M				
			±100	F(±1%)	10 to 2.2M				
<b>Compact Chip Resistor Networks &lt;MNR Series&gt;</b>									
MNR02	1005 × 2		0.063 / Element	±300	J(±5%)	10 to 1M	-55 to +125		
MNR12	1608 × 2			±200	J(±5%)				
MNR32	3216 × 2			±100	F(±1%)				
MNR04	1005 × 4		0.063 / Element	±200	J(±5%)	10 to 1M	-55 to +125		
MNR14	1608 × 4			±200	J(±5%)				
MNR34	3216 × 4			±100	F(±1%)				
				±200	J(±5%)				
<b>Compact 8-Element Chip Resistor Networks &lt;MNR Series&gt;</b>									
MNR15	1608 × 5		0.031 / Element	±200	J(±5%)	56 to 100k	-55 to +125		
MNR35	3216 × 5			±200	J(±5%)	56 to 100k			
MNR18	1605 × 8			0.063 / Element	±200	J(±5%)		10 to 1M	
<b>Chip Attenuators &lt;RCN Series&gt;</b>									
Part No.	Size (inch)	Circuit	No. of pins	No. of elements	Rated power (W)	Impedance (Ω)	Voltage standing wave ratio	Operating temperature range (°C)	
RCN02	1010 (0402)		4	3	0.04 / Package	50	Less than 1.3	-55 to +125	
<b>Narrow Pitch Paper Tape Chip Resistors</b>									
Part No.	Size (inch)	Pitch (Taping)	Minimum Order Quantity						
MCR03MZPJ	1608(0603)	2mm	10,000 pcs.						
MCR03MZPFX									
MCR03MZPD									
<b>1608-Sized EMI Filters &lt;MCF Series&gt;</b>									
Part No.	Size (inch)	Circuit	Rated current (A)	Capacitance tolerance	Capacitance (pF)	Operating temperature range (°C)			
MCF18	1608 (0603)		4	M(±20%)	1,000 to 100,000	-55 to +125			
					1,000,000	-55 to + 85			
					★ 220,000 to 470,000	-55 to + 85			

★ : Under development

\* : The temperature characteristics will vary depending on the resistance value

# Thick Film Low Ohmic Chip Resistors



## UCR Series (11mΩ~)

### Summary

Thick film resistive elements were used to create this lineup of ultra-low resistance products ranging from 11mΩ to 910mΩ. Ideal for current detection.

### Features

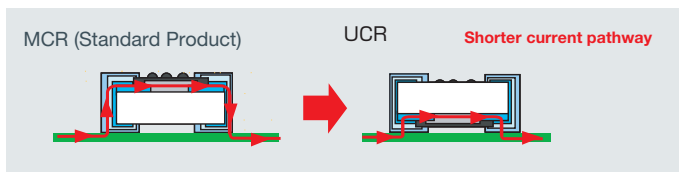
- Compact
- High performance

### Applications

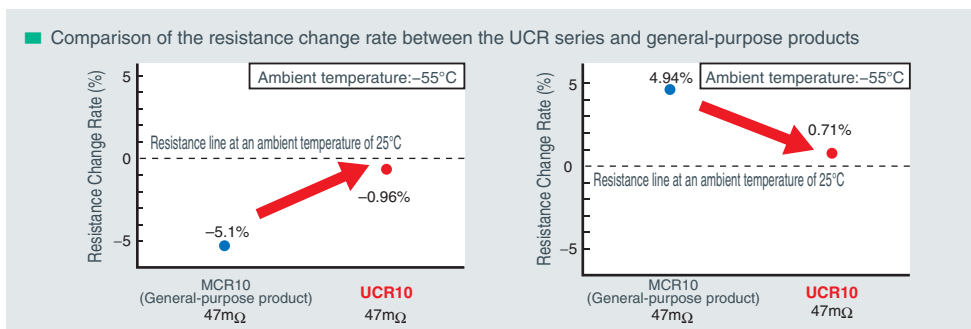
- Notebook PCs, mobile phones, HDDs, portable audio players, power supplies, motors, and more

## Resistance changes minimized

The rear-mount structure prevents changes in the resistance value during mounting.



## Stable, low resistance characteristics guaranteed - regardless of ambient conditions



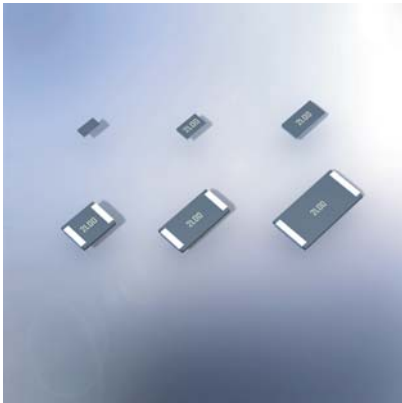
### Lineup

Part No.	Size (mm(inch))	Circuit	Rated power (W)	Tolerance	Temperature coefficient (ppm/°C)	Resistance range (Ω)	Operating temperature range (°C)
★ UCR01	1005(0402)		1/8 (0.125)	J(±5%) F(±1%)	0 to 300	68m to 910m	
★ UCR03	1608(0603)		1/4 (0.25)	J(±5%) F(±1%)	0 to 250 0 to 200	20m to 47m 51m to 91m	
			1/5 (0.20)	J(±5%) F(±1%)	0 to 250 0 to 200	20m to 47m 51m to 91m	
				J(±5%) F(±1%)	0 to 150	100m to 910m	
			UCR10	2012(0805)	1/3 (0.33)	J(±5%) F(±1%)	250±200 0 to 250
J(±5%) F(±1%)	0 to 150 0 to 250					51m to 100m 20m to 47m	
1/2 (0.5)	J(±5%) F(±1%)				0 to 150 0 to 350	51m to 100m 11m to 18m	
	J(±5%) F(±1%)				0 to 200 0 to 150	20m to 39m 43m to 100m	

★ : Under development

\* The designs and specifications are subject to change without notice

# Ultra-Low Ohmic Chip Resistors for Current Detection



## PMR Series (1mΩ~)

### Summary

These ultra-low ohmic chip resistors utilize ROHM's original structural design for improved current detection precision. A full lineup is available in resistances ranging from 1mΩ to 10mΩ.

### Features

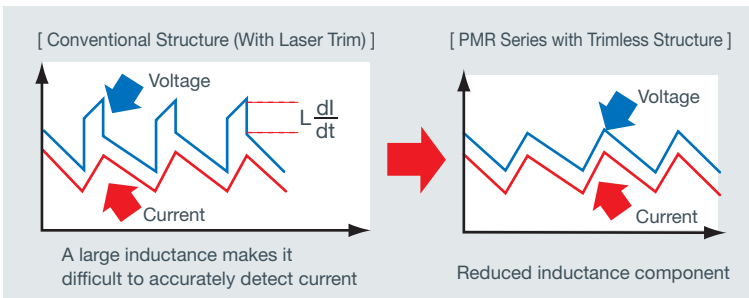
- High power

### Applications

- Current detection sets
- Notebook PCs, HDDs, mobile phones, DC/DC converters, automotive systems, and more

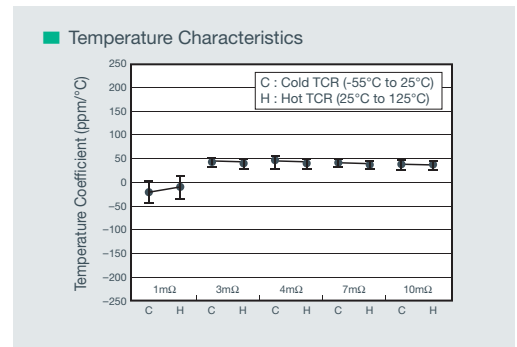
## Unique trimless structure

- Ideal for high-speed switching circuits
- Excellent heat dissipation characteristics
- Stable operation, even under extreme temperature fluctuations

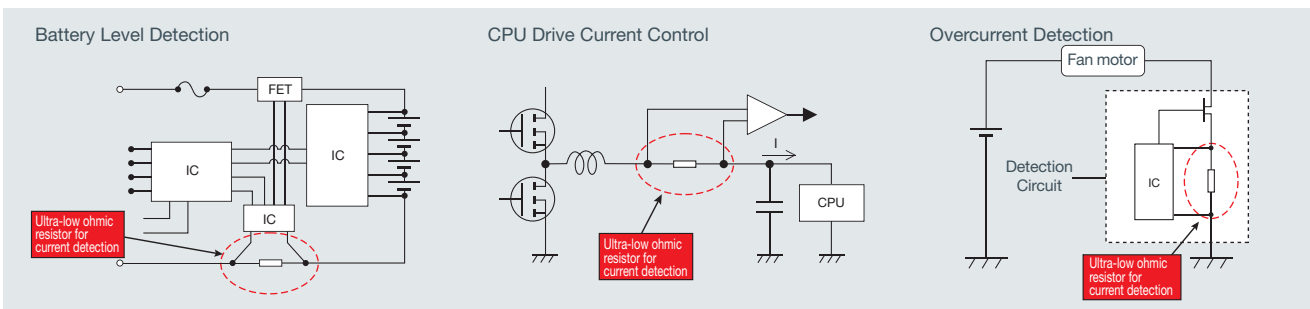


## Superior Resistance-Temperature Characteristics

- Stable resistance temperature characteristics



## Circuit Examples

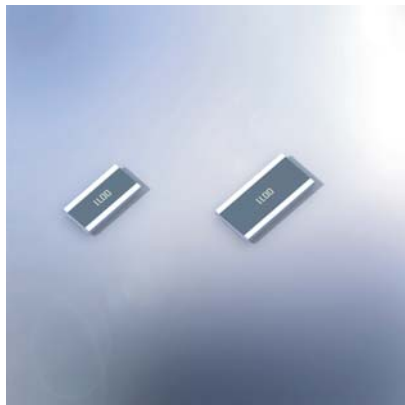


## Lineup

Part No.	Size (mm(inch))	Circuit	Rated power (W)	Tolerance	Temperature coefficient (ppm/°C)	Resistance range (Ω)	Operating temperature range (°C)
PMR03	1608(0603)		1/4 (0.25)	J(±5%) F(±1%)	±150	10m	-55 to +155
PMR10	2012(0805)		1/2 (0.5)	J(±5%) G(±2%) F(±1%)	±150	2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m	
			3/4 (0.75)	J(±5%) F(±1%)	±150		
PMR18	3216(1206)		1	J(±5%) F(±1%)	±100	1m, 2m, 3m, 4m, 5m	
PMR25	3225(1210)		1	J(±5%) F(±1%)	±100	1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m	
PMR50	5025(2010)		1	J(±5%) F(±1%)	±100		
PMR100	6432(2512)		2	J(±5%) F(±1%)	±100*		

\*1mΩ and 2mΩ only: ±150ppm/°C

# Ultra-Low Ohmic Wide Terminal Chip Resistors for Current Detection



## PML Series (0.5mΩ~)

### Summary

ROHM's ultra-low ohmic wide terminal chip resistors utilize a proprietary design for improved current detection accuracy. Available in a range of resistances, from 0.5mΩ to 2.2mΩ.

### Features

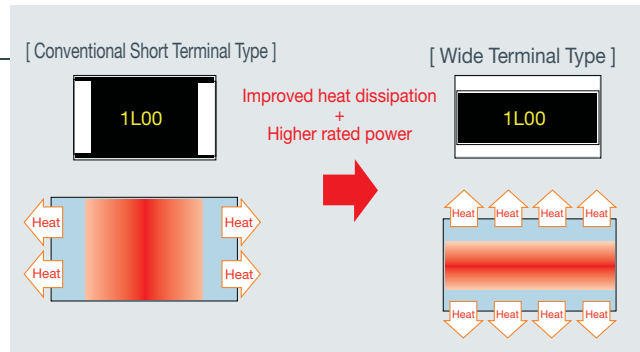
- High performance
- High reliability

### Applications

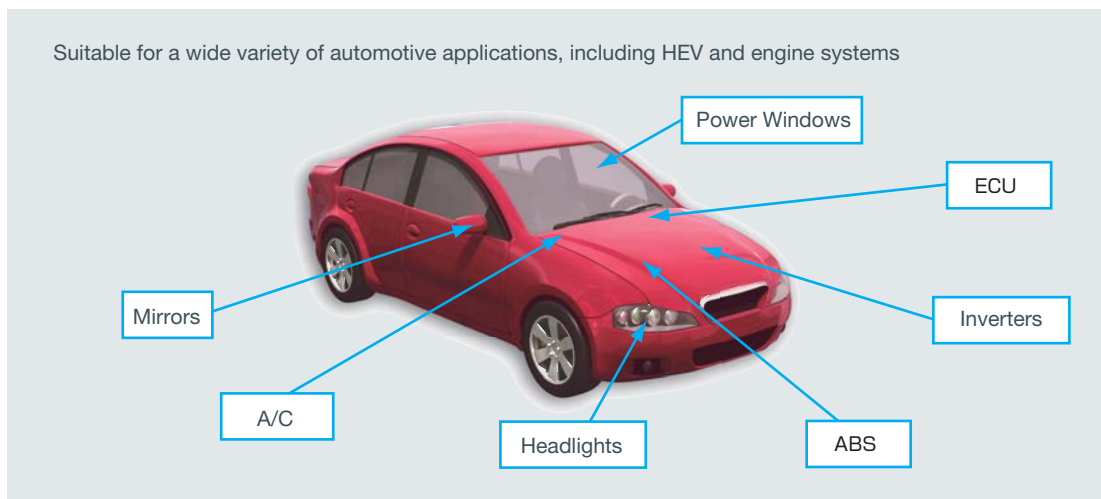
- Automotive (i.e. power steering, ECU)
- Current detection in large current motors

## Wide terminal configuration improves reliability

- Improved heat dissipation.
- Higher rated power (3W guaranteed in the 6432 size)
- Wider contact area with the mounting plate provides a more reliable connection. Ideal for vehicle applications exposed to temperature cycling / fluctuations.



### Application Examples



### Lineup

Part No.	Size (mm(inch))	Circuit	Rated power (W)	Tolerance	Temperature coefficient (ppm/°C)	Resistance range (Ω)	Operating temperature range (°C)
★ PML50	5025(2010)	R	2	J(±5%)	±200	0.5m, 1m, 1.5m, 2m, 2.2m	-55 to +155
★ PML100	6432(2512)		3	J(±5%)	±200		

★ : Under development

\*The designs and specifications are subject to change without notice

# High Power Wide Terminal Chip Resistors (Low Ohmic Type)



## LTR10 Series (47mΩ~)

### Summary

ROHM's novel heat dissipation design ensures higher rated power. The broad lineup ranges from 47mΩ to 9.1Ω.

### Features

- High performance
- High reliability

### Applications

- Automotive systems
- PCs, HDDs, and other devices requiring current detection

## The industry's highest rated power

- Original heat dissipation design ensures higher power handling capability

### Rated Power

Size	General-purpose MCR Series	LTR Series
2012	0.25W	0.5W

## Excellent temperature cycling resistance

- Optimized design results in lower TCR than conventional products

[ Example ]

MCR (47mΩ) 500±300ppm/°C  
 ↓  
 LTR (47mΩ) ±150ppm/°C

### Temperature Coefficient

Size	General-purpose MCR Series	LTR Series
5025	500±300 (0.047 to 0.091Ω) 400±200 (0.1 to 0.13Ω) ±250 (0.15 to 9.1Ω)	±150

## Rear-mount structure

The rear-mount structure minimizes resistance changes during mounting.

Rated power is also significantly improved.

( Top view ) ( Side view )

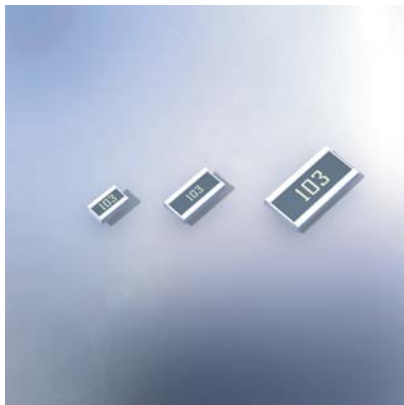


### Lineup

Part No.	Size (mm(inch))	Circuit	Rated power (W)	Tolerance	Temperature coefficient (ppm/°C)	Resistance range (Ω)	Operating temperature range (°C)
LTR10	2012(0805)		1/2 (0.5)	J(±5%) F(±1%)	±150	47m to 9.1	-55 to +155

\* The designs and specifications are subject to change without notice

# High Power Wide Terminal Chip Resistors



## LTR Series

### Summary

Making the long side of the resistor the electrode reduces the distance between the electrodes, improving temperature cycling strength.

### Features

- Strong against surges
- High reliability

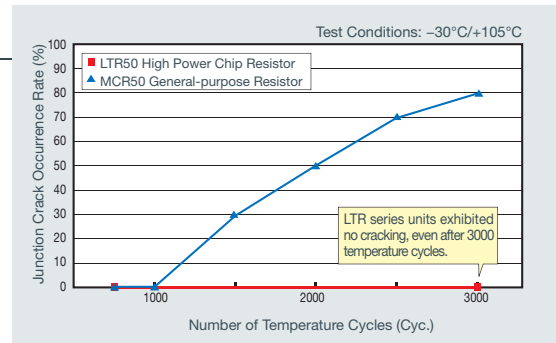
### Applications

- Automotive systems, HDDs, and more

## Superior connection reliability against thermal cycling

- Outstanding junction reliability characteristics against heat cycling.
- The LTR series is highly resistant to soldering cracks caused by thermal stress.

	Wide Terminal LTR Series	General-purpose MCR Series
Distance Between Electrodes	Short	Long
Effects of PCB Expansion/Contraction	Mechanical stress on junction area <b>small</b>	Mechanical stress on junction area <b>large</b>
Junction Reliability	Very good	Good



## 3kV\* electrostatic discharge resistance

(\*EIAJ4710-1 Human Body Model)

ROHM's unique resistive element structure and trimming design ensure greatly improved surge resistance characteristics. Only ROHM guarantees an electrostatic discharge resistance of 3kV (wide terminal type).

■ High Power Chip Resistors (Wide Terminal Type) vs. General-purpose Chip Resistors (MCR Series)

<2012 Size>

<3216 Size>

<5025 Size>

	LTR10/LTR18	LTR50
DCV (Applied Voltage)	3kV	5kV
No. of Cycles	±10times	±10times
C (Capacitance)	100 pF	100 pF
R1 (Discharge Resistance)	1.5kΩ	1.5kΩ

**Significantly higher rated power**

Higher rated power makes it possible to use smaller resistors.

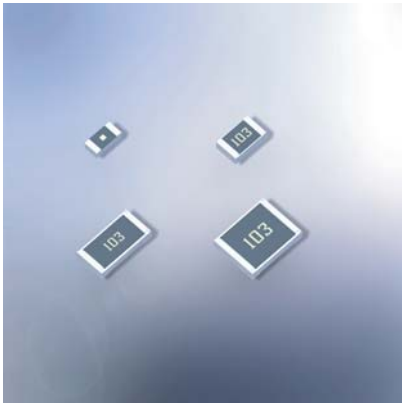
	LTR Series	MCR Series
2012	0.25	0.125
3216	0.5	0.25
5025	1	0.5
6432	-	1

### Lineup

Part No.	Size (mm(inch))	Circuit	Rated power (W)	Tolerance	Temperature coefficient (ppm/°C)	Resistance range (Ω)	Operating temperature range (°C)
★ LTR10	2012(0805)		1/4 (0.25)	J(±5%)	±200	1 to 1M	-55 to +155
				F(±1%)	±100	10 to 1M	
				D(±0.5%)	±100	10 to 1M	
LTR18	3216(1206)		1/2 (0.5)	J(±5%)	±200	1 to 1M	
				F(±1%)	±100	10 to 1M	
				D(±0.5%)	±100	10 to 1M	
LTR50	5025(2010)	1	J(±5%)	±200	1 to 1M		
			F(±1%)	±100	10 to 130k		
			D(±0.5%)	±100	10 to 130k		

★ : Under development

# Anti-Surge Chip Resistors



## ESR Series

### Summary

Significantly improved anti-surge characteristics have been achieved due to utilization of original resistor construction and trimming processes.

### Features

- Small
- Surge-resistant

### Applications

- Electronic devices requiring anti-surge and anti-pulse characteristics.

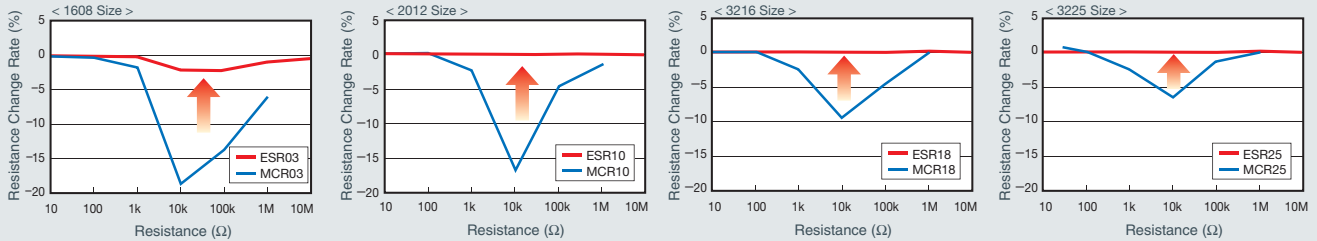
## 3kV\* electrostatic discharge resistance (≒EIAJ4701-1 Human Body Model)

An electrostatic discharge resistance of 3kV has been achieved using novel construction and trimming processes, resulting in a greater degree of reliability.

	ESR03/10/18	ESR25
DCV (Applied Voltage)	3kV	5kV
No. of Cycles	±10 times	±10 times
C (Capacitance)	100 pF	100 pF
R1 (Discharge Resistance)	1.5kΩ	1.5kΩ

### Significant improvement in endurance surge characteristics

■ Anti-surge Chip Resistors (ESR Series) vs. Conventional Chip Resistors (MCR Series)



## Double the conventional rated power

Significantly improved voltage resistance characteristics have been achieved through utilization of original resistive element structure and trimming design.

Only ROHM guarantees 0.2W in the 1608 size.

A higher rated power enables smaller resistors to be used, saving space.

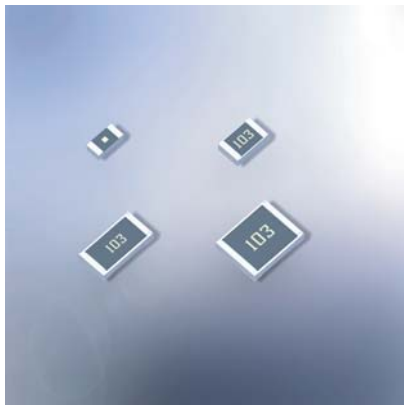
	ESR Series	General-purpose MCR Series
1608	0.2W	0.1W
2012	0.25W	0.125W
3216	0.33W	0.25W
3225	0.5W	0.25W
5025	-	0.5W

Downsizing

### Lineup

Part No.	Size (mm(inch))	Circuit	Rated power (W)	Tolerance	Temperature coefficient (ppm/°C)	Resistance range (Ω)	Operating temperature range (°C)
ESR03	1608(0603)		1/5 (0.2)	J(±5%)	±200	1 to 10M	-55 to +155
				F(±1%)	±100	10 to 1M	
ESR10	2012(0805)		1/4 (0.25)	J(±5%)	±200	1 to 10M	
				F(±1%)	±100	10 to 1M	
ESR18	3216(1206)		1/3 (0.33)	J(±5%)	±200	1 to 10M	
				F(±1%)	±100	10 to 1M	
ESR25	3225(1210)		1/2 (0.5)	J(±5%)	±200	1 to 10M	
				F(±1%)	±100	10 to 1M	

# High Voltage Resistance Chip Resistors



## KTR Series

### Summary

High voltage characteristics (more than double that of conventional products) have been achieved through the use of proprietary construction and trimming processes.

### Features

- Compact
- High voltage

### Applications

- Camera flash circuits
- Inverter circuits
- Power supplies

## High voltage resistance

ROHM's unique resistance pattern and trimming design prevent concentration of the voltage load, resulting in more than twice the voltage resistance of our own general-purpose products (MCR series).

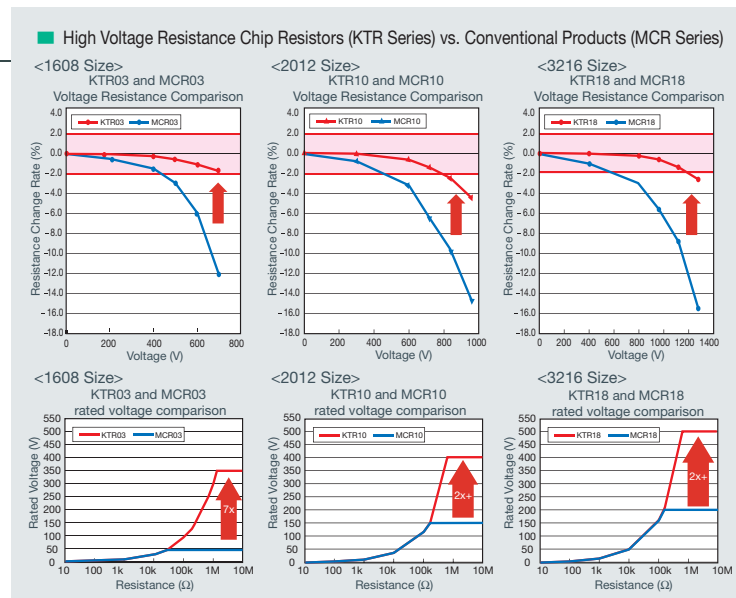
High voltage resistance circuits requiring multiple resistors can reduce the number of components by replacing conventional chip resistors with KTR series units. They are ideal for mobile products, which are becoming increasingly compact and thin.

### [Limiting Element Voltage]

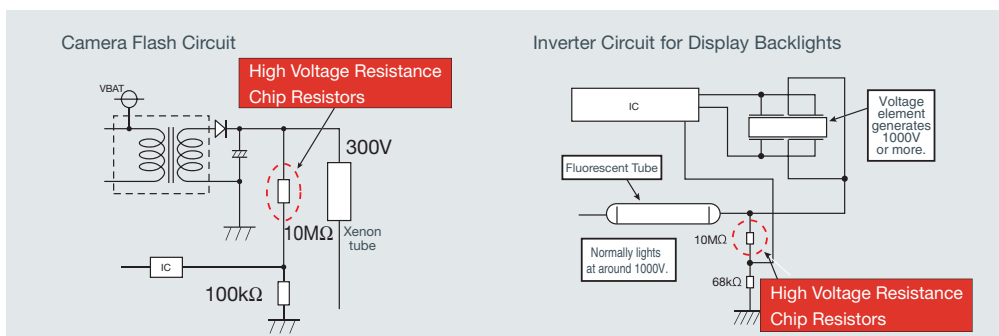
The rated voltage is defined as the maximum voltage that can be applied continuously and is calculated using the following equation:

$$\text{Rated Voltage (V)} = \sqrt{\text{Rated Power (W)} \times \text{Nominal Resistance (\Omega)}}$$

Note that the limiting element voltage of the element should not to be exceeded.



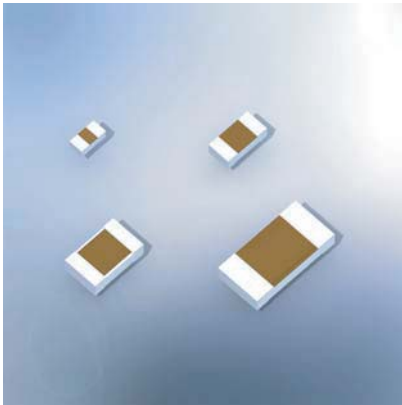
### Circuit Examples



### Lineup

Part No.	Size (mm(inch))	Circuit	Rated power (W)	Limiting element voltage (V)	Tolerance	Temperature coefficient (ppm/°C)	Resistance range (Ω)	Operating temperature range (°C)
KTR03	1608(0603)		1/10 (0.1)	350	J(±5%) F(±1%)	±200 ±100	1 to 10M	-55 to +155
KTR10	2012(0805)		1/8 (0.125)	400	J(±5%) F(±1%)	±200 ±100	1 to 10M	
KTR18	3216(1206)		1/4 (0.25)	500	J(±5%) F(±1%)	±200 ±100	1 to 10M	
KTR25	3225(1210)		1/3 (0.33)	600	J(±5%) F(±1%)	±200 ±100	1 to 10M	

# Sulfuration-Resistant Chip Resistors



## TRR Series

### Summary

The special internal structure prevents sulfurated gases from entering, resulting in greater reliability and stabler operation in sulfur-rich environments compared to general-purpose products.

### Features

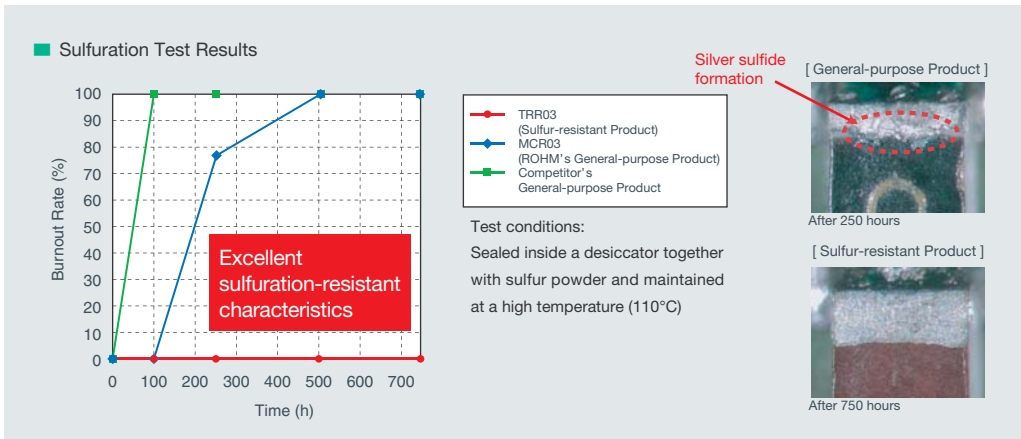
- High reliability

### Applications

- Circuits exposed to sulfur-rich environments, such as those in automotive systems.

## Reliable in sulfurated environments

Until now, resistors were particularly susceptible to failure in sulfur-rich environments. In response to this, ROHM's offers the TRR series featuring an internal structure resistant to silver migration and the formation of silver sulfide, resulting in a greater level of reliability.

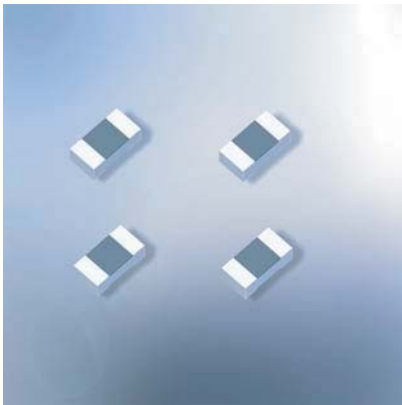


### Lineup

Part No.	Size (mm(inch))	Circuit	Rated power (W)	Tolerance	Temperature coefficient (ppm/°C)	Resistance range (Ω)	Operating temperature range (°C)	
TRR01	1005(0402)		1/16 (0.063)	J(±5%)	+500/-250	1 to 9.1		
				F(±1%)	±200	10 to 10M		
TRR03	1608(0603)		1/10 (0.1)	J(±5%)	±200	1 to 9.1		
				F(±1%)	±100	10 to 10M		
TRR10	2012(0805)		1/8 (0.125)	J(±5%)	±400	1 to 9.1		-55 to +155
				F(±1%)	±100	10 to 2.2M		
TRR18	3216(1206)	1/4 (0.25)	J(±5%)	±400	1 to 9.1			
			F(±1%)	±100	10 to 2.2M			

Also compatible with jumpers.

# 0402-Sized Ultra-Compact Chip Resistors



## MCR004 Series

### Summary

ROHM's 0402-sized ultra-compact chip resistors are the smallest in the world, contributing to increased space savings in mobile devices and module products.

### Features

- Compact
- Space-saving

### Applications

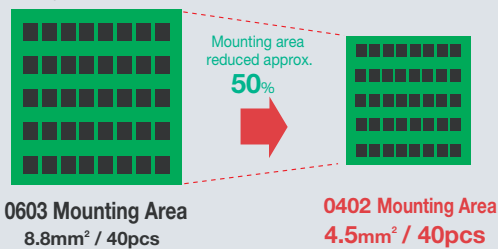
- Modules
- Portable audio
- Mobile phones
- Digital cameras

## Lightweight · Space-saving

Surface area is reduced by 56% compared to the MCR006 (0603) and MCR004 (0402) package types, respectively, ensuring suitability with compact, cutting-edge applications.

Smaller footprint saves space, contributing to greater miniaturization

Example:



## High dimensional precision

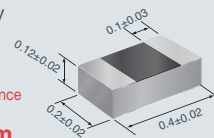
Ultra-compact chip resistors in the 0402 and 0603 size require more precise process technologies (compared to conventional processes) in order to ensure high dimensional accuracy.

### Precision semiconductor processing technology

utilized for high dimensional accuracy

Substrate  
Dimensional Tolerance  
**±0.02mm**

Terminal  
Dimensional Tolerance  
**±0.03mm**

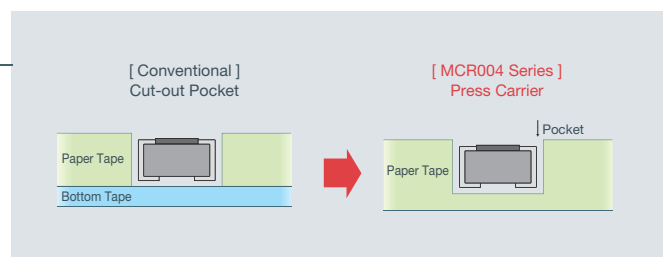


## Press carrier tape applications

Press carrier tape is used in order to reduce failures during the mounting process.

— Press Carrier Tape Features —

- No adhesive substance on the bottom of the pocket (bottom tape not used).
- Highly precise pocket position.



### Lineup

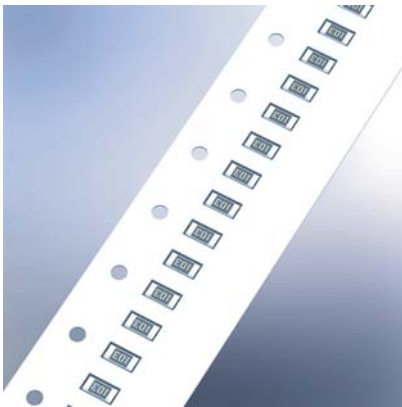
Part No.	Size (mm(inch))	Circuit	Rated power (W)	Tolerance	Temperature coefficient (ppm/°C)	Resistance range (Ω)	Operating temperature range (°C)
<b>New</b> MCR004	0402(01005)		1/32 (0.031)	J(±5%) F(±1%)	±250 ±250	10 to 3M 10 to 3M	-55 to +125

Also compatible with jumpers.

### <Taping Specifications>

Part No.	Taping No.	Taping specs	Min. order quantity (pcs)
MCR004	YZP	Paper tape (2mm pitch)	15,000
	<b>New</b> RZP	Embossed tape (1mm pitch)	40,000

# Narrow Pitch Paper Tape Products



## MCR03MZP Series

### Summary

The pitch is half that of standard products, resulting in double the quantity per reel in the same reel size (φ180mm).

### Features

- Halves the number of reel changes
- Cuts the amount of packaging waste by 50%

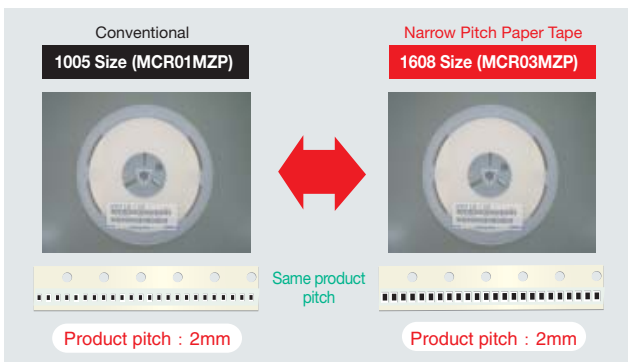
### Applications

- All products

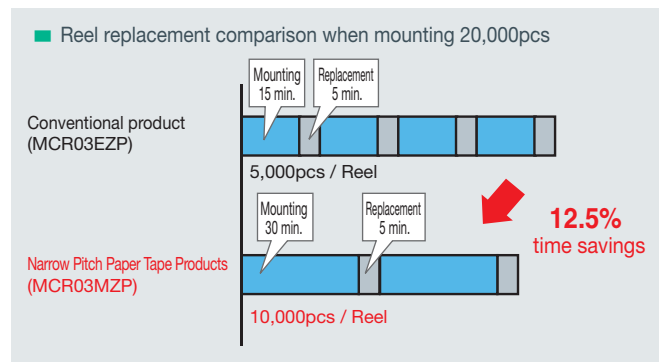
**Doubles the time between reel replacement. Cuts package waste in half.**



**No new equipment required · Easy to install**



**Improves productivity by halving the number of reel replacements**



### Lineup

Part No.	Size (mm(inch))	Product Pitch (Taping)	Reel
MCR03MZPJ	1608(0603)	2mm	10,000 pcs.
MCR03MZPFX			
MCR03MZPD			

# 1608-Sized EMI Filters



## MCF18 Series

### Summary

Large current compatibility (4A) in the industry's smallest size (1608).

### Features

- Compact
- High performance

### Applications

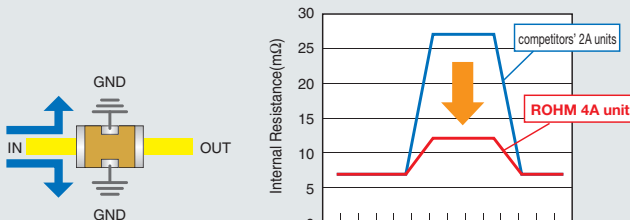
- Digital TVs, DVDs, digital camcorders
- Mobile phones
- Copiers and more

## High performance

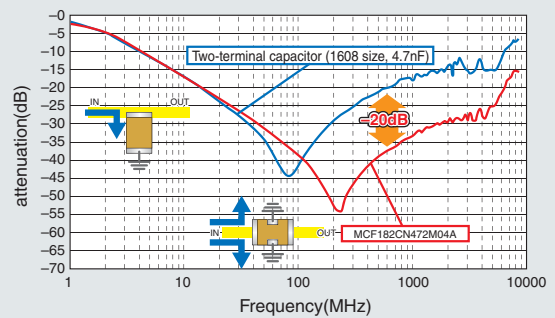
The amount of attenuation in high frequency bands is vastly improved compared to two-terminal capacitors, resulting in greater noise removal efficiency. The number of parts required is reduced as well.

- Internal resistance is lower than in standard products (competitors' 2A units)

1. Decreased line-side voltage
2. Reduced heat generation due to energization



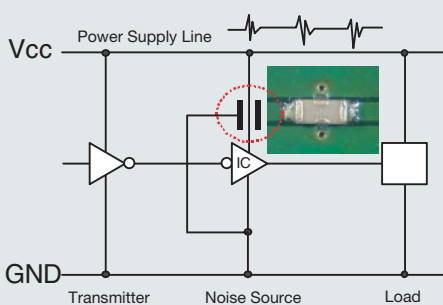
### Attenuation Characteristics Comparison



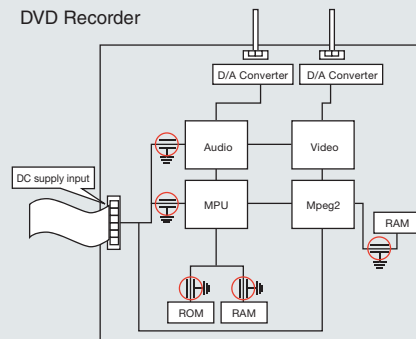
- Only ROHM offers 4A products in the 1608 size  
Ideal for high current circuits in or around the power supply.

## Circuit Examples

- Ideal for noise reduction on large current power lines



DVD Recorder



## Lineup

Part No.	Size (mm(inch))	Circuit	Rated current (A)	Capacitance Tolerance	Capacitance (pF)	Operating temperature range (°C)
MCF18	1608(0603)		4	M(±20%)	1,000 to 100,000	-55 to +125
					1,000,000	-55 to + 85
					★ 220,000 to 470,000	-55 to + 85

★ : Under development

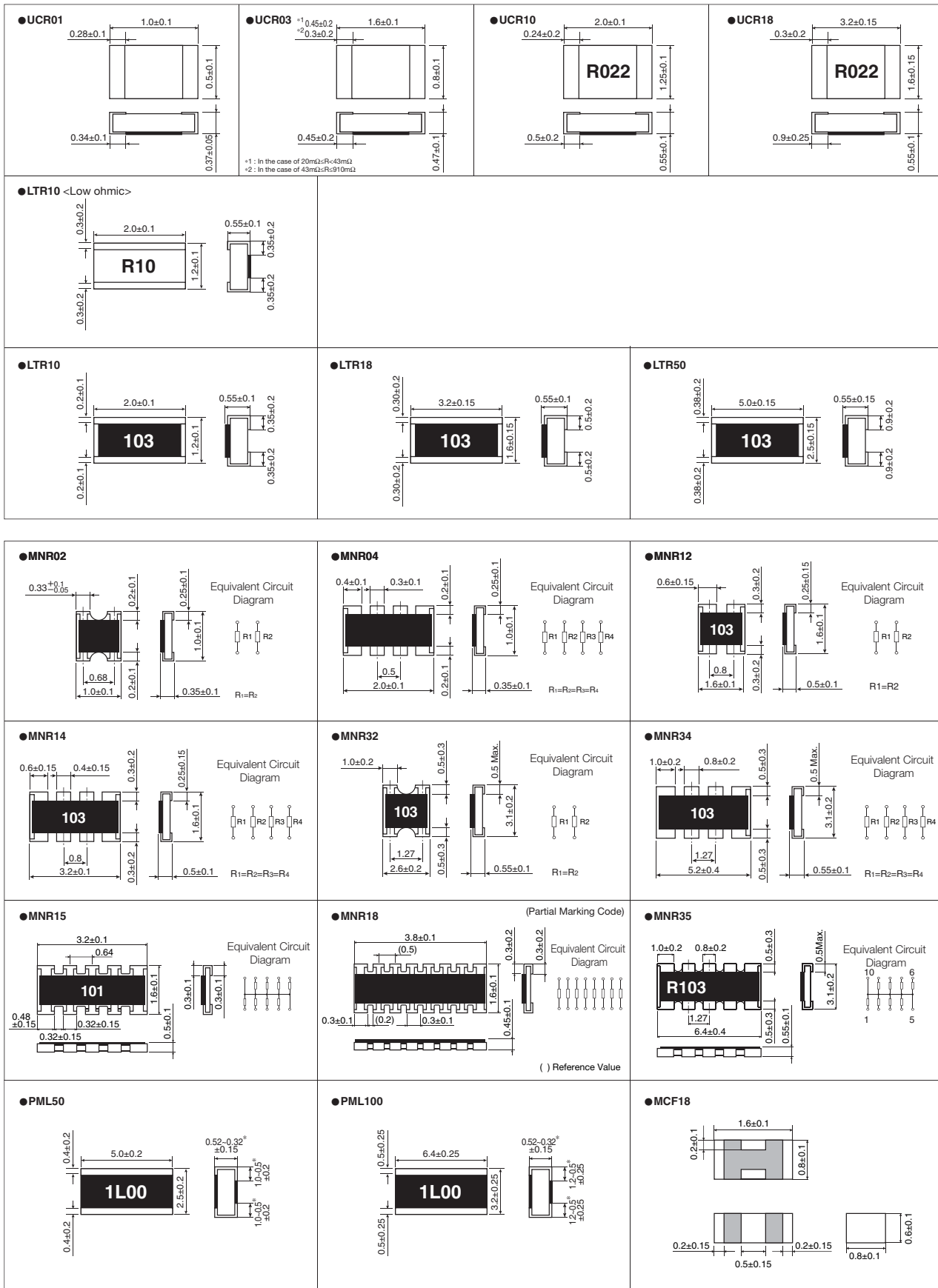
\* : The designs and specifications are subject to change without notice

# Dimensions

Unit : mm(inch)

Dimensions	Series	L	W	t	a	b
0402 (01005) 	MCR004	0.4±0.02	0.2±0.02	0.13±0.02	0.1±0.03	0.1±0.03
0603 (0201) 	MCR006	0.6±0.03	0.3±0.03	0.23±0.03	0.1±0.05	0.15±0.05
1005 (0402) 	MCR01	1.0±0.05	0.5±0.05	0.35±0.05	0.2±0.1	0.25 <sup>+0.05</sup> <sub>-0.1</sub>
	TRR01				0.33±0.08	
1608 (0603) 	MCR03	1.6±0.1	0.8±0.1	0.45±0.1	0.3±0.2	0.3±0.2
	KTR03				0.4±0.1	
	ESR03					
	TRR03	—	0.35±0.15			
2012 (0805) 	MCR10	2.0±0.1	1.25±0.1	0.55±0.1	0.4±0.2	0.4±0.2
	KTR10				0.43 <sup>+0.15</sup> <sub>-0.1</sub>	
	ESR10					
	TRR10	—	0.6 to 0.2* ±0.15			
3216 (1206) 	MCR18	3.2±0.15	1.6±0.15	0.55±0.1	0.5±0.25	0.5±0.25
	KTR18				0.69 <sup>+0.20</sup> <sub>-0.15</sub>	
	ESR18					
	TRR18	—	0.9 to 0.4* ±0.15			
3225 (1210) 	MCR25	3.2±0.15	2.5±0.15	0.55±0.15	0.5±0.25	0.5±0.25
	KTR25			0.55±0.1		
	ESR25			0.55±0.15		
	PMR25	3.2±0.2	2.5±0.2	0.52 to 0.32* ±0.15	0.5±0.2	1.2 to 0.5* ±0.2
5025 (2010) 	MCR50	5.0±0.15	2.5±0.15	0.55±0.15	0.6±0.25	0.6±0.25
	PMR50	5.0±0.2	2.5±0.2	0.52 to 0.32* ±0.15	0.5±0.2	1.9 to 0.9* ±0.2
6432 (2512) 	MCR100	6.3±0.15	3.2±0.15	0.55±0.15	0.6±0.25	0.6±0.25
	PMR100	6.4±0.25	3.2±0.25	0.52 to 0.32* ±0.15	0.5±0.25	2.3 to 1.1* ±0.25

Note: Numbers in ( ) indicate the size in inches  
 \*May vary depending on the resistance value. For additional details, please consult with a local sales representative.



\* May vary depending on the resistance value. For additional details, please consult with a local sales representative.

The content specified in this document is correct as of 1st October, 2009.

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R0039A

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<b>Boston</b> +1-978-371-0382	<b>Espoo</b> +358-9725-54491	<b>Hangzhou</b> +86-571-87658072	<b>Hong Kong</b> +852-2-740-6262
<b>Chicago</b> +1-847-368-1006	<b>Salo</b> +358-2-7332234	<b>Nanjing</b> +86-25-8689-0015	<b>Taipei</b> +886-2-2500-6956
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<b>Denver</b> +1-303-708-0908	<b>Barcelona</b> +34-9375-24320	<b>Qingdao</b> +86-532-8577-9312	<b>Singapore</b> +65-6332-2322
<b>Detroit</b> +1-248-348-9920	<b>Hungary</b> +36-1-4719338	<b>Suzhou</b> +86-512-6807-1300	<b>Philippines</b> +63-2-807-6872
<b>Nashville</b> +1-615-620-6700	<b>Poland</b> +48-22-5757213	<b>Wuxi</b> +86-510-82702693	<b>Thailand</b> +66-2-254-4890
<b>Mexico</b> +52-33-3123-2001	<b>Russia</b> +7-495-739-41-74	<b>Guangzhou</b> +86-20-3878-8100	<b>Kuala Lumpur</b> +60-3-7958-8355
<b>Düsseldorf</b> +49-2154-9210	<b>Seoul</b> +82-2-8182-700	<b>Huizhou</b> +86-752-205-1054	<b>Penang</b> +60-4-2286453
<b>Munich</b> +49-8999-216168	<b>Masan</b> +82-55-240-6234	<b>Fuzhou</b> +86-591-8801-8698	<b>Kyoto</b> +81-75-365-1218
<b>Stuttgart</b> +49-711-7272-370	<b>Dalian</b> +86-411-8230-8549	<b>Dongguan</b> +86-769-8393-3320	<b>Yokohama</b> +81-45-476-2290
<b>France</b> +33-1-5697-3060	<b>Beijing</b> +86-10-8525-2483	<b>Shenzhen</b> +86-755-8307-3008	

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SEMICONDUCTOR