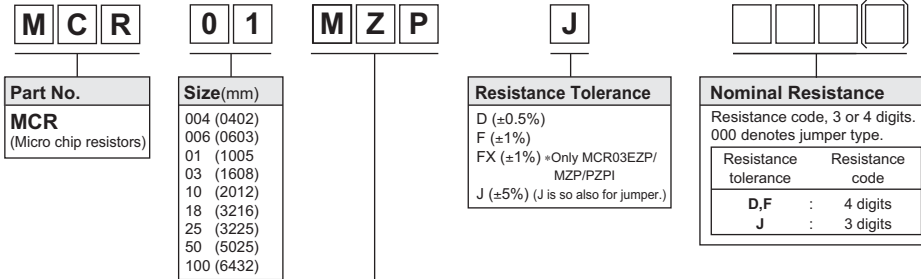


### Thick Film Chip Resistors : MCR Series



Packaging Specifications Code								
Part No.	Code	Resistance Tolerance			Packing Specification	Quantity / Reel (pcs)	Reel	Automotive Grade Available (AEC-Q200)
		J (±5%)	F (±1%)	D (±0.5%)				
MCR004	QLP	⊙	⊙	-	Paper tape (2mm pitch)	15,000	φ180mm (7inch)	Yes
MCR006	YLP	⊙	⊙	⊙				
MCR01	MZP	⊙	⊙	⊙	Paper tape (2mm pitch)	10,000		
MCR03	EZP	⊙	⊙	⊙	Paper tape (4mm pitch)	5,000		
MCR10	ERT, EZP	⊙	⊙	⊙				
MCR18		⊙	⊙	⊙				
MCR25	JZH	⊙	⊙	-	Embossed tape (4mm pitch)	4,000		
MCR50								
MCR100								

Real (φ180mm) : Compatible with JEITA standard "EIAJ ET-7200B"  
 ⊙ : Standard product

## Low Ohmic Thick Film Chip Resistors : MCR Series

<b>M</b>	<b>C</b>	<b>R</b>	<b>1</b>	<b>0</b>	<b>E</b>	<b>Z</b>	<b>H</b>	<b>J</b>	<b>L</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<b>Part No.</b> MCR (Micro chip resistors)			<b>Size(mm)</b> 006 (0603) 01 (1005) 03 (1608) 10 (2012) 18 (3216) 25 (3225) 50 (5025) 100 (6432)				<b>Resistance Tolerance</b> F (±1%) J (±5%)		<b>Special part code</b> L 0.1 to 9.1Ω (±1%) 0.1 to 0.91Ω (±5%) S 0.047 to 0.091Ω		<b>Nominal Resistance</b> Resistance code, 3 or 4 digits. Resistance tolerance + Resistance code Special part number FL, FS, JS : 4 digits JL : 3 digits			

Packaging Specifications Code							
Part No.	Code	Resistance Tolerance		Packing Specification	Quantity / Reel (pcs)	Reel	Automotive Grade Available (AEC-Q200)
		J (±5%)	F (±1%)				
MCR006	YCP	-	⊙	Paper tape (2mm pitch)	15,000	φ180mm (7inch)	Yes
MCR01	MZP	-	⊙	Paper tape (2mm pitch)	10,000		
MCR03	EZP	-	⊙	Paper tape (4mm pitch)	5,000		
MCR10	EZH	⊙	⊙	Paper tape (4mm pitch)	5,000		
MCR18							
MCR25	JZH	⊙	⊙	Embossed tape (4mm pitch)	4,000		
MCR50							
MCR100							

Real (φ180mm) : Compatible with JEITA standard "EIAJ ET-7200B"

⊙ : Standard product

## Chip Resistor Networks : MNR Series

<b>M</b>	<b>N</b>	<b>R</b>	<b>0</b>	<b>2</b>	<b>M</b>	<b>0</b>	<b>A</b>	<b>P</b>	<b>J</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>Part No.</b> MNR (Chip Resistor Networks)			<b>Size(mm)</b> 02 (1005 · 2) 04 (1005 · 4) 12 (1608 · 2) 14 (1608 · 4) 15 (1608 · 5) 18 (1605 · 8) 32 (3216 · 2) 34 (3216 · 4) 35 (3216 · 5)				<b>Resistance Tolerance</b> F (±1%) J (±5%) (J is so also for jumper.)		<b>Nominal Resistance</b> Resistance code, 3 or 4 digits. 000 denotes jumper type. Resistance tolerance    Resistance code F : 4 digits J : 3 digits				

Packaging Specifications Code							
Part No.	Code	Resistance Tolerance		Packing Specification	Quantity / Reel (pcs)	Reel	Automotive Grade Available (AEC-Q200)
		J (±5%)	F (±1%)				
MNR02	M0AP	⊙	-	Paper tape (2mm pitch)	10,000	φ180mm (7inch)	Yes
MNR04							
MNR12	E0AP	⊙	⊙	Paper tape (4mm pitch)	5,000		
MNR14							
MNR15	E0RP	⊙	-	Paper tape (4mm pitch)	5,000		
MNR18							
MNR32							
MNR34	J0AB	⊙	-	Embossed tape (4mm pitch)	4,000		
MNR35	J5AB						
MNR35	J5R						

Real (φ180mm) : Compatible with JEITA standard "EIAJ ET-7200B"

⊙ : Standard product

## Ultra-low Ohmic Chip Resistors for Current Detection : PMR Series

<b>P M R</b>	<b>2 5</b>	<b>H Z P</b>	<b>J</b>	<b>V</b>	
<b>Part No.</b> <b>PMR</b> (Ultra-low Ohmic Chip Resistors for Current Detection)	<b>Size(mm)</b> 01 (1005) 03 (1608) 10 (2012) 18 (3216) 25 (3225) 50 (5025) 100 (6432)		<b>Resistance Tolerance</b> F (±1%) G (±2%) J (±5%)	<b>Special part code</b> U 5 to 10mΩ V 1 to 4mΩ * Jumper type doesn't have a special part code.	<b>Nominal Resistance</b> Resistance code, 3 or 4 digits. Resistance Value   Resistance tolerance J   F,G Jumper 000   - 1mΩ 1L0   1L00 2mΩ 2L0   2L00 3mΩ 3L0   3L00 4mΩ 4L0   4L00 5mΩ 5L0   5L00 6mΩ 6L0   6L00 7mΩ 7L0   7L00 8mΩ 8L0   8L00 9mΩ 9L0   9L00 10mΩ 10L   10L0

Packaging Specifications Code								
Part No.	Code	Resistance Tolerance			Packing Specification	Quantity / Reel (pcs)	Reel	Automotive Grade Available (AEC-Q200)
		J (±5%)	G (±2%)	F (±1%)				
PMR01	MZP	⊙	-	-	Paper tape (2mm pitch)	10,000	φ180mm (7inch)	Yes
PMR03	EZP	⊙	-	-	Paper tape (4mm pitch)	5,000		
PMR10		⊙	⊙	⊙				
PMR18		⊙	-	⊙				
PMR25		HZP	⊙	-				
PMR50	⊙		-	⊙				
PMR100	⊙		-	⊙				

Reel (φ180mm) : Compatible with JEITA standard "EIAJ ET-7200B"

⊙ : Standard product

## Ultra-low Ohmic Chip Resistors for Current Detection &lt;Wide Terminal type&gt; : PML Series

<b>P M L</b>	<b>5 0</b>	<b>H Z P</b>	<b>J</b>	<b>V</b>	
<b>Part No.</b> <b>PML</b> (Ultra-low Ohmic Chip Resistors for Current Detection <Wide Terminal type>)	<b>Size(mm)</b> 10 (2012) 18 (3216) 50 (5025) 100 (6432)		<b>Resistance Tolerance</b> G (±2%) J (±5%)	<b>Special part code</b>	<b>Nominal Resistance</b> Resistance code, 3 or 4 digits. Resistance Value   Resistance tolerance J   G 0.5mΩ 0L5   0L50 1mΩ 1L0   1L00 1.5mΩ 1L5   1L50 2mΩ 2L0   2L00 2.2mΩ 2L2   - 2.5mΩ 2L5   2L50

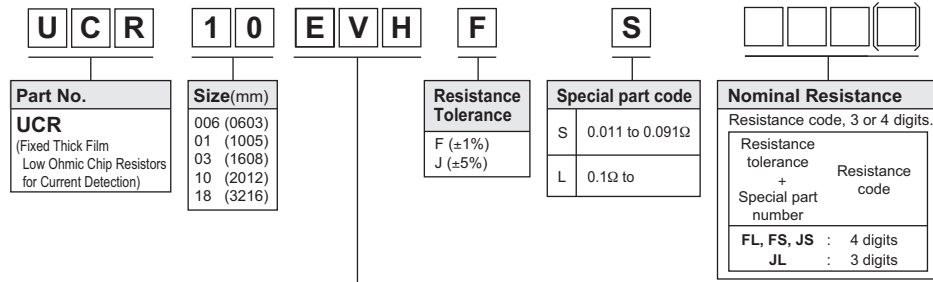
Packaging Specifications Code							
Part No.	Code	Resistance Tolerance		Packing Specification	Quantity / Reel (pcs)	Reel	Automotive Grade Available (AEC-Q200)
		J (±5%)	G (±2%)				
PML10	EZP	⊙	⊙	Paper tape (4mm pitch)	2,000	φ180mm (7inch)	Yes
PML18		⊙	⊙				
PML50	HZP	☆	-	Embossed tape (4mm pitch)	5,000		
PML100		⊙	-				

Reel (φ180mm) : Compatible with JEITA standard "EIAJ ET-7200B"

⊙ : Standard product

☆ : Under development

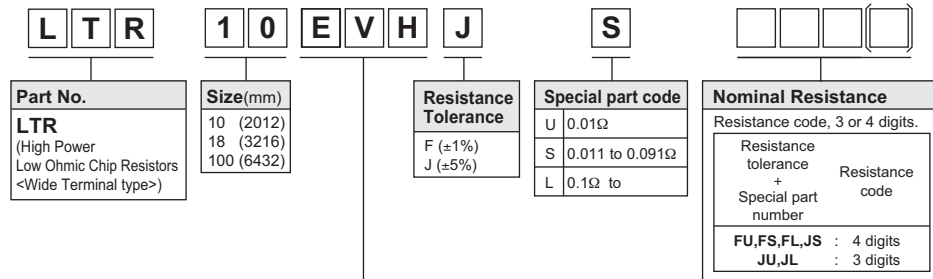
**Thick Film Low Ohmic Chip Resistors for Current Detection : UCR Series**



Packaging Specifications Code								
Part No.	Code	Resistance Tolerance		Packing Specification	Quantity / Reel (pcs)	Reel	Remarks	Automotive Grade Available (AEC-Q200)
		J (±5%)	F (±1%)					
UCR006	YVP	⊙	⊙	Paper tape (4mm pitch)	15,000	φ180mm (7inch)	-	-
UCR01	MVP	⊙	⊙	Paper tape (2mm pitch)	10,000		-	Yes
UCR03	EWP	⊙	⊙	Paper tape (4mm pitch)	5,000		20 to 47mΩ	Yes*
	EVP						51 to 910mΩ	
UCR10	EVH	⊙	⊙	Paper tape (4mm pitch)	5,000		-	Yes
UCR18							Yes	

Real (φ180mm) : Compatible with JEITA standard "EIAJ ET-7200B"  
 ⊙ : Standard product  
 \* : Limited to 100mW and higher

**High Power Low Ohmic Chip Resistors <Wide Terminal type> : LTR Series**

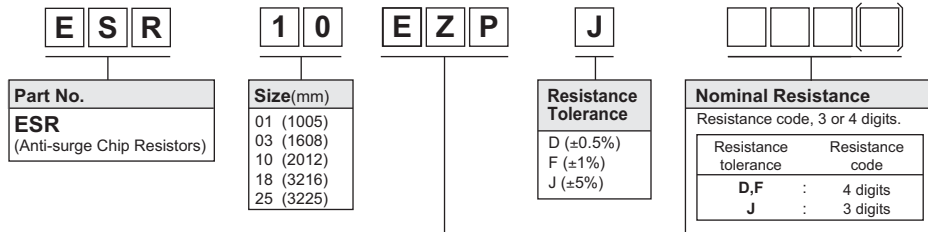


Packaging Specifications Code							
Part No.	Code	Resistance Tolerance		Packing Specification	Quantity / Reel (pcs)	Reel	Automotive Grade Available (AEC-Q200)
		J (±5%)	F (±1%)				
LTR10	EVH	⊙	⊙	Paper tape (4mm pitch)	5,000	φ180mm (7inch)	Yes
LTR18	EZP						
LTR100	JZP			Embossed tape (4mm pitch)	4,000		

Real (φ180mm) : Compatible with JEITA standard "EIAJ ET-7200B"  
 ⊙ : Standard product

### Anti-surge Chip Resistors : ESR Series

### High Anti-surge Chip Resistors : SDR Series

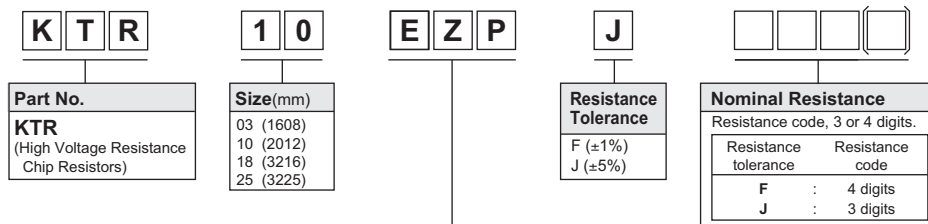


Packaging Specifications Code								
Part No.	Code	Resistance Tolerance			Packing Specification	Quantity / Reel (pcs)	Reel	Automotive Grade Available (AEC-Q200)
		J (±5%)	F (±1%)	D (±0.5%)				
SDR03	EZP	○	○	○	Paper tape (4mm pitch)	5,000	φ180mm (7inch)	Yes
ESR01	MZP	○	○	-	Paper tape (4mm pitch)	10,000		
ESR03	EZP	○	○	○	Paper tape (4mm pitch)	5,000		
ESR10								
ESR18								
ESR25	JZP	○	○	○	Embossed tape (4mm pitch)	4,000		

Real (φ180mm) : Compatible with JEITA standard "EIAJ ET-7200B"

○ : Standard product

### High Voltage Resistance Chip Resistors : KTR Series

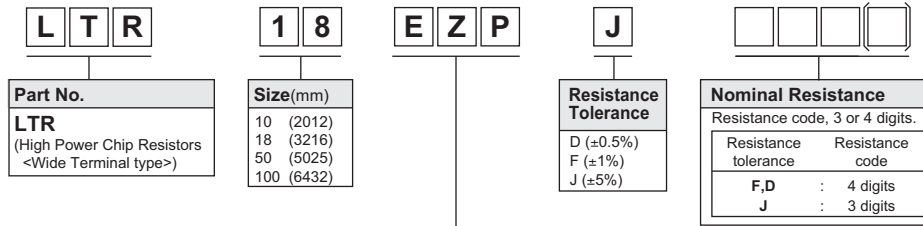


Packaging Specifications Code							
Part No.	Code	Resistance Tolerance		Packing Specification	Quantity / Reel (pcs)	Reel	Automotive Grade Available (AEC-Q200)
		J (±5%)	F (±1%)				
KTR03	EZP	○	○	Paper tape (4mm pitch)	5,000	φ180mm (7inch)	Yes
KTR10							
KTR18							
KTR25	JZP	○	○	Embossed tape (4mm pitch)	4,000		

Real (φ180mm) : Compatible with JEITA standard "EIAJ ET-7200B"

○ : Standard product

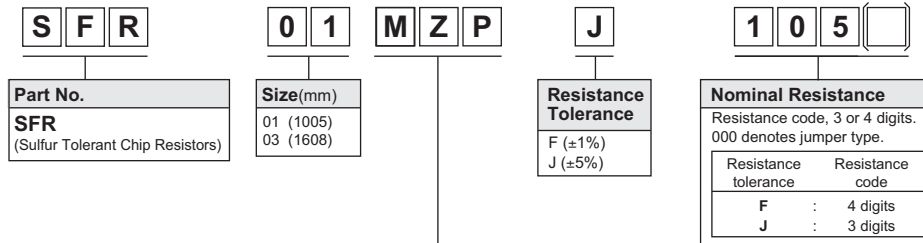
## High Power Chip Resistors &lt;Wide Terminal type&gt; : LTR Series



Packaging Specifications Code								
Part No.	Code	Resistance Tolerance			Packing Specification	Quantity / Reel (pcs)	Reel	Automotive Grade Available (AEC-Q200)
		J (±5%)	F (±1%)	D (±0.5%)				
LTR10	EZP	○	○	○	Paper tape (4mm pitch)	5,000	φ180mm (7inch)	Yes
LTR18								
LTR50	UZP	○	○	○	Embossed tape (4mm pitch)	5,000		
LTR100	JZP	○	○	○				

Real (φ180mm) : Compatible with JEITA standard "EIAJ ET-7200B"  
 ○ : Standard product

## Sulfur Tolerant Chip Resistors : SFR Series



Packaging Specifications Code								
Part No.	Code	Resistance Tolerance		Packing Specification	Quantity / Reel (pcs)	Reel	Automotive Grade Available (AEC-Q200)	
		J (±5%)	F (±1%)					
SFR01	MZP	○	○	Paper tape (2mm pitch)	10,000	φ180mm (7inch)	Yes	
SFR03	EZP	○	○	Paper tape (4mm pitch)	5,000			

Real (φ180mm) : Compatible with JEITA standard "EIAJ ET-7200B"  
 ○ : Standard product

# Notice

## Precaution on using ROHM Products

1. If you intend to use our Products in devices requiring extremely high reliability (such as medical equipment <sup>(Note 1)</sup>, aircraft/spacecraft, nuclear power controllers, etc.) and whose malfunction or failure may cause loss of human life, bodily injury or serious damage to property ("Specific Applications"), please consult with the ROHM sales representative in advance. Unless otherwise agreed in writing by ROHM in advance, ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of any ROHM's Products for Specific Applications.

(Note1) Medical Equipment Classification of the Specific Applications

JAPAN	USA	EU	CHINA
CLASS III	CLASS III	CLASS II b	CLASS III
CLASS IV		CLASS III	

2. ROHM designs and manufactures its Products subject to strict quality control system. However, semiconductor products can fail or malfunction at a certain rate. Please be sure to implement, at your own responsibilities, adequate safety measures including but not limited to fail-safe design against the physical injury, damage to any property, which a failure or malfunction of our Products may cause. The following are examples of safety measures:
  - [a] Installation of protection circuits or other protective devices to improve system safety
  - [b] Installation of redundant circuits to reduce the impact of single or multiple circuit failure
3. Our Products are not designed under any special or extraordinary environments or conditions, as exemplified below. Accordingly, ROHM shall not be in any way responsible or liable for any damages, expenses or losses arising from the use of any ROHM's Products under any special or extraordinary environments or conditions. If you intend to use our Products under any special or extraordinary environments or conditions (as exemplified below), your independent verification and confirmation of product performance, reliability, etc, prior to use, must be necessary:
  - [a] Use of our Products in any types of liquid, including water, oils, chemicals, and organic solvents
  - [b] Use of our Products outdoors or in places where the Products are exposed to direct sunlight or dust
  - [c] Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, and NO<sub>2</sub>
  - [d] Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
  - [e] Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
  - [f] Sealing or coating our Products with resin or other coating materials
  - [g] Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
  - [h] Use of the Products in places subject to dew condensation
4. The Products are not subject to radiation-proof design.
5. Please verify and confirm characteristics of the final or mounted products in using the Products.
6. In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
7. De-rate Power Dissipation (Pd) depending on Ambient temperature (Ta). When used in sealed area, confirm the actual ambient temperature.
8. Confirm that operation temperature is within the specified range described in the product specification.
9. ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

## Precaution for Mounting / Circuit board design

1. When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.
2. In principle, the reflow soldering method must be used on a surface-mount products, the flow soldering method must be used on a through hole mount products. If the flow soldering method is preferred on a surface-mount products, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

### Precautions Regarding Application Examples and External Circuits

1. If change is made to the constant of an external circuit, please allow a sufficient margin considering variations of the characteristics of the Products and external components, including transient characteristics, as well as static characteristics.
2. You agree that application notes, reference designs, and associated data and information contained in this document are presented only as guidance for Products use. Therefore, in case you use such information, you are solely responsible for it and you must exercise your own independent verification and judgment in the use of such information contained in this document. ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of such information.

### Precaution for Electrostatic

This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

### Precaution for Storage / Transportation

1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
  - [a] the Products are exposed to sea winds or corrosive gases, including Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, and NO<sub>2</sub>
  - [b] the temperature or humidity exceeds those recommended by ROHM
  - [c] the Products are exposed to direct sunshine or condensation
  - [d] the Products are exposed to high Electrostatic
2. Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.
3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.
4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

### Precaution for Product Label

QR code printed on ROHM Products label is for ROHM's internal use only.

### Precaution for Disposition

When disposing Products please dispose them properly using an authorized industry waste company.

### Precaution for Foreign Exchange and Foreign Trade act

Since concerned goods might be fallen under listed items of export control prescribed by Foreign exchange and Foreign trade act, please consult with ROHM in case of export.

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