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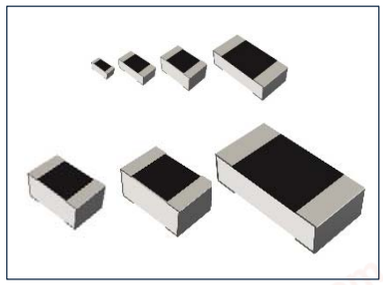
General purpose chip resistors <High power>

MCRS series

Datasheet

● Features

1) Guaranteed the same rated power as one size larger product by changing the design of the resistive element.
2) Circuit space can be saved.
(reducing the area by about 60% by replacing 0603 size with 0402 size)
3) ROHM resistors have obtained ISO9001 / IATF16949 certification.
4) Corresponds to AEC-Q200.



● Products list

Part No.	Size (mm)	Size (inch)	Rated power (W)	Rated ambient temperature (°C)	Rated terminal temperature (°C)	Limiting element voltage (V)	Resistance tolerance (%)	Temperature coefficient (ppm/°C)	Resistance range (Ω)	Operating temperature range (°C)	Automotive grade Available (AEC-Q200)
MCR01S	1005	0402	0.1	70	New 125	75	New D (±0.5%)	±100	10≦R<100 (E24/96 series)	-55 ～ +155	Yes
							New D (±0.5%)	±50	100≦R≦1M (E24/96 series)		
							F (±1%)	±250	1≦R<10 (E24 series)		
							F (±1%)	±100	10≦R≦10M (E24/96 series)		
							J (±5%)	±100	1≦R<10 (E24 series)		
							J (±5%)	±200	10≦R≦10M (E24 series)		
						(Jumper type) Resistance : Max. 50mΩ, Rated current : 1.5A					
MCR03S	1608	0603	0.125	70	New 125	150	New D (±0.5%)	±100	10≦R<100 (E24/96 series)	-55 ～ +155	Yes
							New D (±0.5%)	±50	100≦R≦1M (E24/96 series)		
							F (±1%)	±250	1≦R<10 (E24 series)		
							F (±1%)	±100	10≦R≦10M (E24/96 series)		
							J (±5%)	±400	1≦R<10 (E24 series)		
							J (±5%)	±200	10≦R≦10M (E24 series)		
						(Jumper type) Resistance : Max. 50mΩ, Rated current : 2A					
MCR10S	2012	0805	0.25	70	New 125	200	F (±1%)	±250	1≦R<10 (E24 series)	-55 ～ +155	Yes
							F (±1%)	±100	10≦R≦2.2M (E24/96 series)		
							J (±5%)	±400	1≦R<10 (E24 series)		
							J (±5%)	±200	10≦R≦10M (E24 series)		
						(Jumper type) Resistance : Max. 50mΩ, Rated current : 2.5A					
MCR18S	3216	1206	0.4	70	New 125	200	F (±1%)	±250	1≦R<10 (E24 series)	-55 ～ +155	Yes
							F (±1%)	±100	10≦R≦2.2M (E24/96 series)		
							J (±5%)	±400	1≦R<10 (E24 series)		
							J (±5%)	±200	10≦R≦10M (E24 series)		
						(Jumper type) Resistance : Max. 50mΩ, Rated current : 2.5A					
MCR25S	3225	1210	0.5	70	110	200	F (±1%)	±200	1≦R<10 (E24 series)	-55 ～ +155	Yes
							F (±1%)	±100	10≦R≦2.2M (E24/96 series)		
							J (±5%)	±400	1≦R<5.6 (E24 series)		
							J (±5%)	±200	5.6≦R≦3.3M (E24 series)		
					-	(Jumper type) Resistance : Max. 50mΩ, Rated current : 2A					
MCR50S	5025	2010	1.5	70	105	250	F (±1%)	±200	1≦R<10 (E24 series)	-55 ～ +155	Yes
							F (±1%)	+100/-150*1 ±100*2	10≦R<27 (E24/96 series)		
							F (±1%)	±100	27≦R≦2.2M (E24/96 series)		
							J (±5%)	±400	1≦R<10 (E24 series)		
							J (±5%)	±200	10≦R≦4.7M (E24 series)		
					-	(Jumper type) Resistance : Max. 50mΩ, Rated current : 4A					
MCR100S	6432	2512	2	70	105	250	F (±1%)	±200	1≦R<10 (E24 series)	-55 ～ +155	Yes
							F (±1%)	+100/-150*1 ±100*2	10≦R<27 (E24/96 series)		
							F (±1%)	±100	27≦R≦2.2M (E24/96 series)		
							J (±5%)	±400	1≦R<10 (E24 series)		
							J (±5%)	±200	10≦R≦4.7M (E24 series)		
					-	(Jumper type) Resistance : Max. 50mΩ, Rated current : 4A					

Design and specifications are subject to change without notice. Carefully check the specification sheet supplied with the product before using or ordering it.
E24 : Standard products, E96 : Build to order
Rated voltage is determined from the following.
When rated voltage exceeds the limiting element voltage, the limiting element voltage shall be the rated voltage.
Rated voltage = $\sqrt{\text{Rated power} \times \text{Resistance}}$

*1 : Test temperature +25°C/-55°C
*2 : Test temperature +25°C/+125°C

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● Part number description

MCR	10S	EQP	F	L	1R00
①	②	③	④	⑤	⑥

①

Part No.
MCR General purpose chip resistors

②

Size	(mm)	[inch]
01S	(1005)	[0402]
03S	(1608)	[0603]
10S	(2012)	[0805]
18S	(3216)	[1206]
25S	(3225)	[1210]
50S	(5025)	[2010]
100S	(6432)	[2512]

③

Packing specifications code			
Part No.	Code	Packing specifications	Quantity pcs/reel
MCR01S	MQP	Paper tape (2mm Pitch)	10,000
MCR03S	EQP	Paper tape (4mm Pitch)	5,000
MCR10S	EQP	Paper tape (4mm Pitch)	5,000
MCR18S	EQP	Paper tape (4mm Pitch)	5,000
MCR25S	JQP	Embossed tape (4mm Pitch)	4,000
MCR50S	JQP	Embossed tape (4mm Pitch)	4,000
MCR100S	JQP	Embossed tape (4mm Pitch)	4,000

④

Tolerance
D (±0.5%)
F (±1%)
J (±5%) (Including jumper type)

⑤

Special part code
L(1Ω≦R＜10Ω)*3
*3 : 01S/03S/10S/18S F class 25S/50S/100S F/J class

⑥

Nominal resistance
Resistance code, 3 or 4 digits. 000 denotes jumper type.

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

EX)

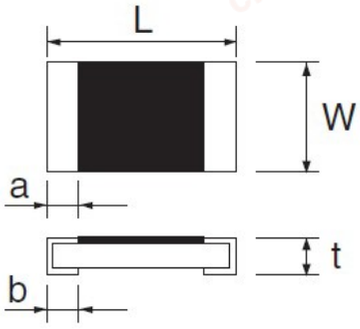
1Ω	=	1R00	(±1%)
		1R0	(±5%)
9.1Ω	=	9R10	(±1%)
		9R1	(±5%)
10Ω	=	10R0	(±1%)
		100	(±5%)
1MΩ	=	1004	(±1%)
		105	(±5%)

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● Chip resistor dimensions and markings

■MCR01S/03S/10S/18S/25S/50S/100S

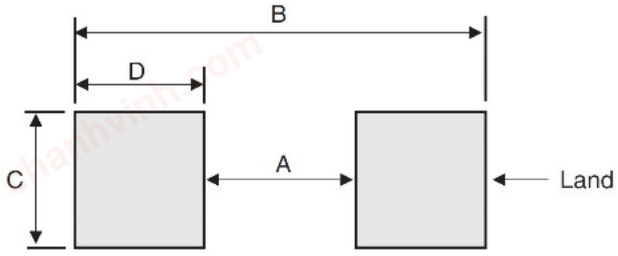


<Marking method>
No marking

(Unit : mm)

Part No.	Type code	(mm)	(inch)	L	W	t	a	b
MCR01S	MQP	1005	0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.25+0.05 -0.10
MCR03S	EQP	1608	0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20
MCR10S	EQP	2012	0805	2.00±0.10	1.25±0.10	0.55±0.10	0.40±0.20	0.40±0.20
MCR18S	EQP	3216	1206	3.20+0.15 -0.20	1.60±0.15	0.55±0.10	0.50±0.25	0.50±0.25
MCR25S	JQP	3225	1210	3.20+0.15 -0.20	2.50±0.15	0.55±0.10	0.40±0.20	0.50±0.25
MCR50S	JQP	5025	2010	5.00±0.15	2.50±0.15	0.55±0.15	0.60±0.25	0.60±0.25
MCR100S	JQP	6432	2512	6.40±0.15	3.15±0.15	0.55±0.15	0.60±0.25	1.00±0.25

● Land pattern example



(Unit : mm)

Part No.	A	B	C	D
MCR01S	0.50	1.30	0.50	0.40
MCR03S	1.00	2.00	0.80	0.50
MCR10S	1.20	2.60	1.15	0.70
MCR18S	2.20	4.00	1.50	0.90
MCR25S	2.20	4.00	2.30	0.90
MCR50S	3.80	6.00	2.30	1.10
MCR100S	5.10	8.10	3.00	1.50

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● Derating curve

■MCR01S/03S/10S/18S

For resistors operated at the ambient temperature in excess 70°C or terminal temperature*4 in excess the rated terminal temperature, load shall be derated in accordance with Fig.1 and Fig.2.

■MCR25S

For resistors operated at the ambient temperature in excess 70°C or terminal temperature*4 in excess the rated terminal temperature, load shall be derated in accordance with Fig.1 and Fig.3.

■MCR50S/100S

For resistors operated at the ambient temperature in excess 70°C or terminal temperature*4 in excess the rated terminal temperature, load shall be derated in accordance with Fig.1 and Fig.4.

*4：The measurement part of terminal temperature is center of fillet's surface with load.

Fig.1< Ambient temperature>
■MCR01S/03S/10S/18S/25S/50S/100S

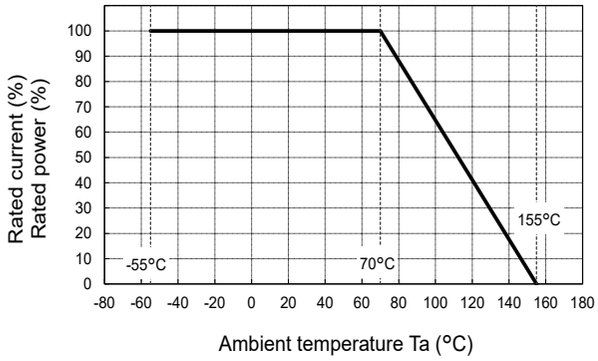


Fig.2< Terminal temperature>
■MCR01S/03S/10S/18S

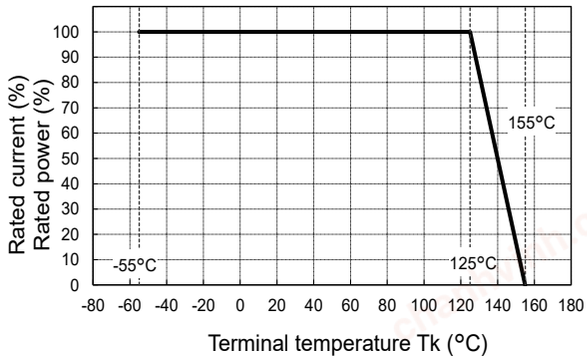


Fig.3< Terminal temperature>
■MCR25S

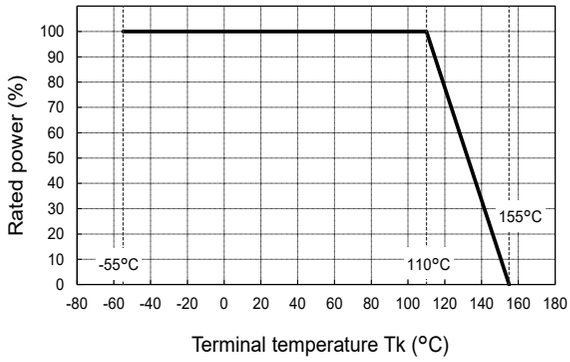
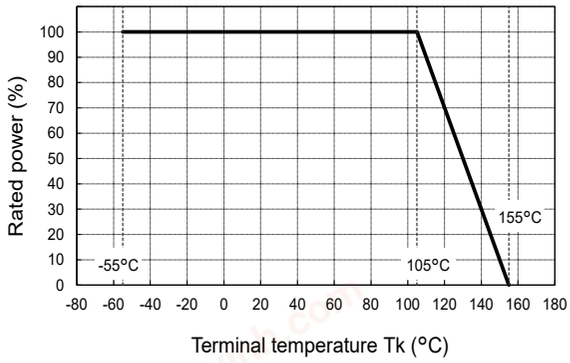


Fig.4< Terminal temperature>
■MCR50S/100S



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● 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"		Test temperature : +25/+125°C (MCR01S/03S/10S/18S) : +25/-55°C,+25/+125°C (MCR25S/50S/100S)
Overload	±(2.0%+0.1Ω)	MAX. 50mΩ	Test voltage is the smaller one of ① or ② ①Rated voltage (current)×2.5 ②Maximum overload voltage*5 Test time : 5s
Solderability	A new uniform coating of minimum of 95% of the surface being immersed and no soldering damage.		Rosin-ethanol solution (25% mass) Soldering condition : 245±5°C Duration of immersion : 2.0±0.5s
Resistance to soldering heat	±(0.5%+0.05Ω) *6 ±(1.0%+0.05Ω) *7 No remarkable abnormality on the appearance.	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～+125°C Test time : 1,000cycles
Damp heat, steady state	±(3.0%+0.1Ω)	MAX. 100mΩ	Test temp. : 85°C Relative humidity : 85% Test time : 1,000h
Endurance at 70°C	±(2.0%+0.1Ω) *6 ±(3.0%+0.1Ω) *7	MAX. 100mΩ	Ambient temperature : Ta=70°C (All size) Terminal temperature : Tk=125°C (MCR01S/03S/10S/18S) : Tk=110°C (MCR25S) : Tk=105°C (MCR50S/100S) Rated voltage (current) 1.5h : ON - 0.5h : OFF Test time : 1,000h
Endurance	±(2.0%+0.1Ω) *6 ±(3.0%+0.1Ω) *7	MAX. 100mΩ	Test temp. : 155°C Test time : 1,000h
Resistance to solvent	±(1.0%+0.05Ω)	MAX. 50mΩ	23±5°C, Immersion cleaning, 5±0.5min Solvent : Isopropyl alcohol
Bend strength of the end face plating	±(1.0%+0.05Ω) Without mechanical damage such as breaks.	MAX. 50mΩ	Endurance with 90mm width Deflection : 3mm (MCR01S/03S/10S/18S) Deflection : 1mm (MCR25S/50S/100S)

Compliance Standards: IEC 60115-1 / IEC 60115-8
JIS C 5201-1 / JIS C 5201-8

*5 Maximum overload voltage (Test voltage)

MCR01S	MCR03S	MCR10S	MCR18S	MCR25S	MCR50S	MCR100S
150V	300V	400V	400V	400V	500V	500V

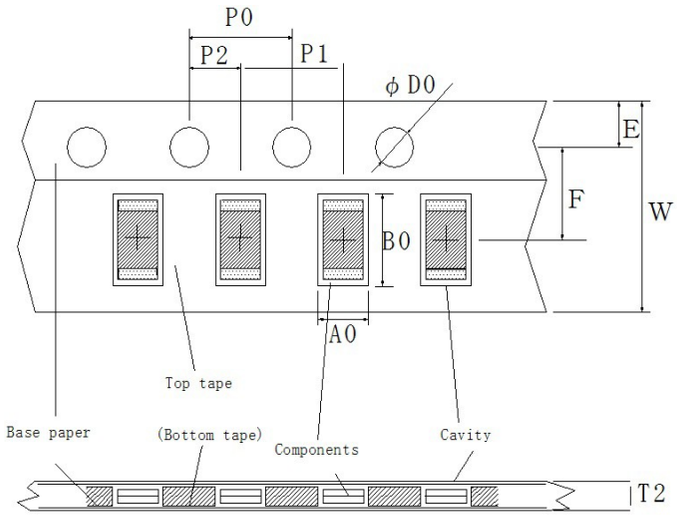
*6 : Applicable size MCR01S/03S/10S/18S
*7 : Applicable size MCR25S/50S/100S

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●Tape dimensions

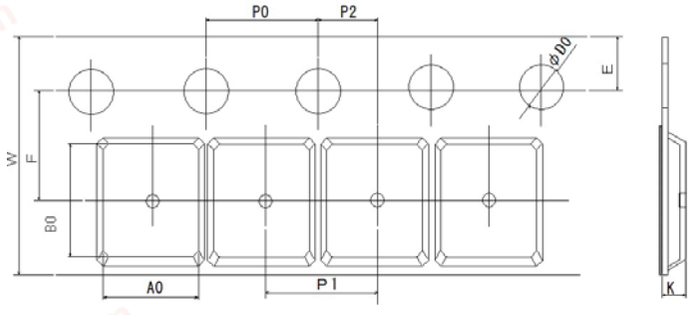
■Paper tape



(Unit : mm)

Part No.	Type code	W	F	E	A0	B0	D0	P0	P1	P2	T2
MCR01S	MQP	8.0±0.3	3.5±0.05	1.75±0.1	0.7±0.1	1.2±0.1	Φ1.5+0.1 0	4.0±0.1	2.0±0.05	2.0±0.05	MAX1.1
MCR03S	EQP	8.0±0.3	3.5±0.05	1.75±0.1	1.1±0.1	1.9±0.1	Φ1.5+0.1 0	4.0±0.1	4.0±0.1	2.0±0.05	MAX1.1
MCR10S	EQP	8.0±0.3	3.5±0.05	1.75±0.1	1.65+0.2 -0.1	2.4+0.2 -0.1	Φ1.5+0.1 0	4.0±0.1	4.0±0.1	2.0±0.05	MAX1.1
MCR18S	EQP	8.0±0.3	3.5±0.05	1.75±0.1	1.95+0.1 -0.05	3.5+0.15 -0.05	Φ1.5+0.1 0	4.0±0.1	4.0±0.1	2.0±0.05	MAX1.1

■Embossed tape



(Unit : mm)

Part No.	Type code	W	F	E	A0	B0	D0	P0	P1	P2	K
MCR25S	JQP	8.0±0.3	3.5±0.05	1.75±0.1	3.0±0.1	3.5±0.1	Φ1.5+0.1 0	4.0±0.1	4.0±0.1	2.0±0.05	MAX1.1
MCR50S	JQP	12.0±0.3	5.5±0.05	1.75±0.1	3.4±0.2	5.6±0.2	Φ1.5+0.1 0	4.0±0.1	4.0±0.1	2.0±0.05	MAX1.1
MCR100S	JQP	12.0±0.3	5.5±0.05	1.75±0.1	3.5±0.2	6.7±0.2	Φ1.5+0.1 0	4.0±0.1	4.0±0.1	2.0±0.05	MAX1.1

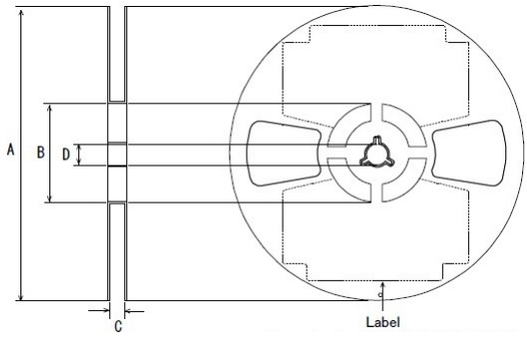
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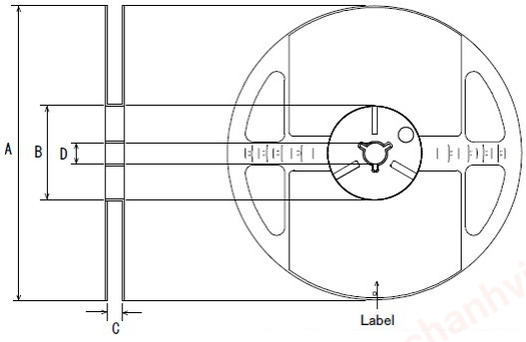
●Reel dimensions

Using two kinds of reels for taping.

■MCR01S/03S/10S/18S/25S



■MCR50S/100S



(Unit : mm)

Part No.	A	B	C	D
MCR01S	Φ180 0 -1.5	Φ60 +1.0 0	9 +1.0 0	Φ13±0.2
MCR03S				
MCR10S				
MCR18S				
MCR25S				
MCR50S			13 +1.0 0	
MCR100S				

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Notice

Precaution on using ROHM Products

1. If you intend to use our Products in devices requiring extremely high reliability (such as medical equipment (Note 1), 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
CLASSⅢ	CLASSⅢ	CLASSⅡb	CLASSⅢ
CLASSⅣ		CLASSⅢ	

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_2, H_2S, NH_3, SO_2, and NO_2
   [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 (Exclude cases where no-clean type fluxes is used. However, recommend sufficiently about the residue.); 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 depending on ambient temperature. When used in sealed area, confirm that it is the use in the range that does not exceed the maximum junction 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

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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_2, H_2S, NH_3, SO_2, and NO_2
   - [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

A two-dimensional barcode 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

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