

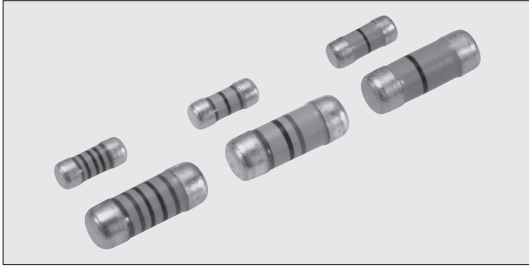
# MELF (METAL FILM, CARBON FILM)



## RN41 ■ MELF Type Fixed Metal Film Resistors

## RD41 ■ MELF Type Fixed Carbon Film Resistors

## CC ■ MELF Type Cross-conductors



Coating color : RN41/CC : Blue, RD41 : Ivory

Color code : RD41 : 3 color-bands

RN41 (E24) : 4 color-bands

RN41 (E24·96) : 5 color-bands

CC : 1 color-band

### ■Features

- SMD resistors.
- Free direction for mounting due to cylindrical design.
- High precision products (Resistance tolerance  $\pm 0.1\%$  and T.C.R.  $\pm 25 \times 10^{-6}/K$ ) available. (RN41)
- The electrode strength is firm.
- The noise characteristics is excellent.
- Suitable for reflow, flow and iron solderings.
- Products meet EU-RoHS requirements.
- AEC-Q200 Tested (RN41 2ES/3AS, CC 12M/25)

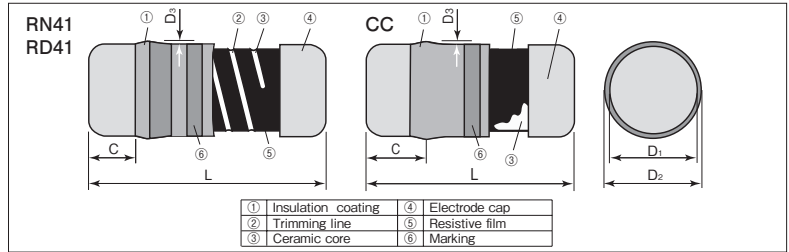
### ■Reference Standards

IEC 60115-8

JIS C 5201-8

EIAJ RC-2132A

### ■Construction



### ■Dimensions

Type (Inch/DIN Size Code)	Dimensions (mm)					Weight (g) (1000pcs)
	L	C	D1	D2 Max.	D3 Max.	
2ES (1406/0204)	3.5 $\pm$ 0.2	0.5~0.9	1.4 $\pm$ 0.1	1.55	0.1	20
CC12M (1406/0204)						
2E·3AS (2309/0207)	5.9 $\pm$ 0.2	0.5min	2.2 $\pm$ 0.1	2.4	0.15	75
CC25 (2309/0207)						

### ■Type Designation

Example

Product Code	Power Rating	Terminal Surface Material	Packaging	Nominal Resistance	Resistance Tolerance	T.C.R. ( $\times 10^{-6}/K$ )
RN41 RD41	2ES:0.25W 0.4W 2E:0.25W 3AS:1W	T:Sn	TE:Taping BK: Bulk	B,C,D,F:4 digits G,J:3 digits	B: $\pm 0.1\%$ C: $\pm 0.25\%$ D: $\pm 0.5\%$ F: $\pm 1\%$ G: $\pm 2\%$ J: $\pm 5\%$	25: $\pm 25$ 50: $\pm 50$ Nil: RD41
CC12M CC25		T:Sn	TE:Taping BK: Bulk			

Contact us when you have control request for environmental hazardous material other than the substance specified by EU-RoHS.

For further information on taping, please refer to APPENDIX C on the back pages.

### ■Ratings

Type	Power Rating	Current Rating	Rated Ambient Temp.	Rated Terminal Part Temp.	T.C.R. ( $\times 10^{-6}/K$ )	Resistance Range and Resistance Tolerance ( $\Omega$ )						Max. Working Voltage	Max. Overload Voltage	Packaging & Q'ty (pcs)	
						B: $\pm 0.1\%$ E24·E96	C: $\pm 0.25\%$ E24·E96	D: $\pm 0.5\%$ E24·E96	F: $\pm 1\%$ E24·E96	G: $\pm 2\%$ E24	J: $\pm 5\%$ E24			Box	Reel
RN41 2ES	0.25W	—	70°C	90°C	$\pm 25$	43~511k	100~100k	100~604k	—	—	—	200V	400V	40,000	3,000
	0.4W <sup>※1,※2</sup>	—	—	90°C	$\pm 50$	—	—	—	1.0~5.11M	—	0.22~0.91	200V	400V	40,000	3,000
RN41 3AS	1W <sup>※1,※2</sup>	—	70°C	90°C	$\pm 50$	—	—	—	1.0~1M	—	0.22~0.91	400V	600V	10,000	1,500
RD41 2ES	0.25W	—	70°C	—	<sup>※3</sup>	—	—	—	—	2.2~1M	2.2~1M	200V	400V	40,000	3,000
RD41 2E	0.25W	—	70°C	—	<sup>※3</sup>	—	—	—	—	1.0~2.2M	1.0~2.2M	300V	600V	10,000	1,500
CC12M	—	2A	70°C	—	—	20m $\Omega$ or under						—	—	40,000	3,000
CC25	—	5A				10,000	1,500								

Operating Temperature Range :  $-55^{\circ}C \sim +155^{\circ}C$

Rated voltage =  $\sqrt{\text{Power Rating} \times \text{Resistance value}}$  or Max. working voltage, whichever is lower.

※1 A power rating is guaranteed at the terminal part temperature.

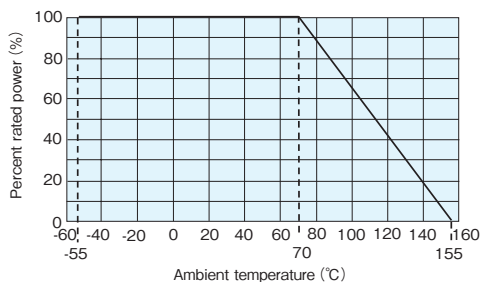
※2 A power rating shall be guaranteed with a method shown in the item. (Performance) Please inquire before you order and/or use.

※3 Please contact us for T.C.R. of RD41.

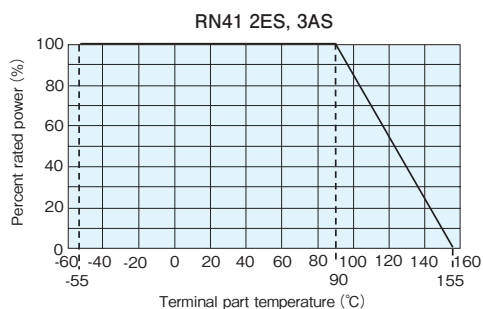
If any questions arise whether to use the "Rated Ambient Temperature" or the "Rated Terminal Part Temperature" in your usage conditions, please give priority to the "Rated Terminal Part Temperature".

For more details, please refer to "Introduction of the derating curves based on the terminal part temperature" on the beginning of our catalog.

## Derating Curve



For resistors operated at an ambient temperature of 70°C or higher, the power shall be derated in accordance with the above derating curve. Please contact us about CC series's derating curve.



When the terminal part temperature of the resistor exceeds the rated terminal part temperature shown above, the power shall be derated according to the derating curve. Please refer to "Introduction of the derating curves based on the terminal part temperature" on the beginning of our catalog before use.

## Performance

Test Items	Type	RD41, RN41		CC		Test Methods
		Performance Requirements*4 $\Delta R \pm (\% + 0.05\Omega)$		Performance Requirements		
		Limit	Typical	Limit	Typical	
Resistance	RN41 RD41	Within specified tolerance	—	Max. 20m $\Omega$	Max. 7.5m $\Omega$	25°C
T.C.R.	RN41 RD41	Within specified T.C.R.	—	—	—	+25°C/+125°C
Overload (Short time)	RN41	2ES : Test group D	0.3	—	—	Rated voltage $\times$ 2.5 or Max. overload vol., whichever is lower, for 5s
	RD41	1.0	0.5			
Intermittent overload	RD41	1.0	—	—	—	Rated voltage $\times$ 4 or Max. Intermittent overload voltage, whichever is lower, 10,000 cycles.
Resistance to soldering heat	RN41	2ES : Test group D	—	Max. 20m $\Omega$	Max. 7.5m $\Omega$	260°C $\pm$ 5°C, 10s $\pm$ 1s
	RD41	1.0	0.5			
Rapid change of temperature	RN41	2ES : Test group D	—	Max. 20m $\Omega$	Max. 7.5m $\Omega$	-55°C (30min.) / +125°C (30min.) , 5 cycles
	RD41	1.0	0.75			
Moisture resistance	RN41	2ES : Test group C	—	Max. 20m $\Omega$	Max. 7.5m $\Omega$	40°C $\pm$ 2°C, 90%~95%RH, 1000h 1.5h ON/0.5h OFF cycle
	RD41	5.0	2.5			
Endurance at 70°C	RN41	2ES : Test group A	—	Max. 20m $\Omega$	Max. 7.5m $\Omega$	70°C $\pm$ 2°C, 1000h 1.5h ON/0.5h OFF cycle
	RD41	2.0	1.0			
Low temperature exposure	RD41	1.0	0.75	—	—	-55°C, 1h
High temperature exposure	RN41	2ES : Test group C	0.75	—	—	+155°C, 2h RN41 2ES, 3AS : 155°C, 1000h
	RD41	2.0	1.0			

\*4 Performance requirement for RN41 3AS are different from the above, so consult with us about the detail.

### RN41 Test group

Stability class	Stability class for each resistance Resistance range	Limit resistance changing attests			
		Test group			
		A	B	C	D
0.25	10~332k $\Omega$	$\pm(0.25+0.05\Omega)$	$\pm(0.50+0.05\Omega)$	$\pm(0.25+0.05\Omega)$	$\pm(0.05+0.05\Omega)$
0.5	1~<10 $\Omega$			$\pm(0.50+0.05\Omega)$	$\pm(0.10+0.05\Omega)$
1	0.22~<1 $\Omega$			$\pm(1.00+0.05\Omega)$	$\pm(0.25+0.05\Omega)$
2	>332k $\Omega$ ~5.11M $\Omega$	$\pm(0.50+0.05\Omega)$	$\pm(1.00+0.05\Omega)$	$\pm(2.00+0.05\Omega)$	$\pm(0.50+0.05\Omega)$

## Precautions for Use

- Ionic impurities such as flux etc. that are attached to these products or those mounted onto a PCB, negatively affect their moisture resistance, corrosion resistance, etc. The flux may contain ionic substances like chlorine, acid, etc. Please wash them to get rid of these ionic substances especially when using lead-free solder that may contain much of the said substances for improving a wetting characteristic. Using RMA solder or RMA flux, or well-washing is needed. Also, attaching ionic substances such as perspiration, salt etc. by storage environments or mounting conditions/environments negatively affects their moisture resistance, corrosion resistance etc. Please wash them to remove the ionic substances when they are polluted.