

Surface Mount Coat-insulated Fixed Metal Film Resistors

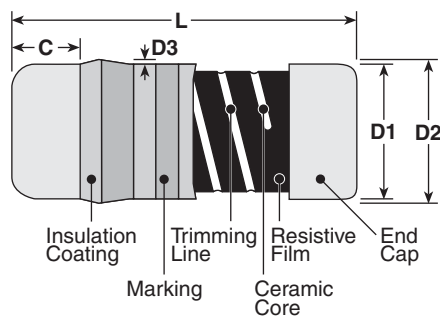
ISO 9001:2000
TS-16949

RN41, RM41 Type

1. Features

- Suitable for reflow and wave soldering
- High stability in short and long term tests
- Products with lead-free terminations meet RoHS requirements.
Pb located in glass material, electrode and resistor element is exempt per Annex 1, exemption 5 of EU directive 2005/95/EC
- Meets or exceeds EIAJ-8009, EIA-PDP-100
- Marking: Blue body color for "RN", green for "RM"

2. Dimensions and Construction



Type (Inch Size Code)	Dimensions inches (mm)				
	L	C (min.)	D1	D2 (max.)	D3 (max.)
2A (0805)	.079±.004 (2.0±0.1)	.012 (0.3)	.049±.002 (1.25±0.05)	.053 (1.35)	.003 (0.07)
2B (1406)	.138±.008 (3.5±0.2)	.02 (0.5)	.057±.004 (1.45±0.1)	.061 (1.55)	.004 (0.1)
2D (1206)	.126±.008 (3.2±0.2)	.02 (0.5)	.061±.006 (1.55±0.15)	.069 (1.75)	
2ES (1406)	.138±.008 (3.5±0.2)	.02 (0.5)	.055±.004 (1.4±0.1)	.061 (1.55)	
2E, 2H (2309)	.232±.008 (5.9±0.2)	.02 (0.5)	.087±.004 (2.2±0.1)	.094 (2.4)	.006 (0.15)
3AS	.232±.008 (5.9±0.2)	.02 (0.5)	.087±.004 (2.2±0.1)	.094 (2.4)	.071 (1.8)

3. Type Designation

The type designation shall be the following form:

New Type

RN41	2B	T	TE	1002	J	50*
Dielectric	Size	Termination Material	Packaging	Nominal Resistance	Tolerance	T.C.R. (ppm/°C)
RN41	2A: 0805 2B: 1406 2D: 1206 2E: 2309 2ES: 1406 2H: 2309 3AS: 2309	T: Sn (Other termination styles may be available, please contact factory for options)	TE: 7" Embossed Plastic (2A, 2B, 2ES - 3,000 pcs/reel) (2D - 2,000 pcs/reel) (2E, 2H, 3AS - 1,500 pcs/reel)	±5%: 2 significant figures + 1 multiplier. "R" indicates decimal on values <10Ω ±1%: 3 significant figures + 1 multiplier. "R" indicates decimal on values <100Ω	B = ±0.1% C = ±0.25% D = ±0.5% F = ±1% J = ±5%	25 50 100 200

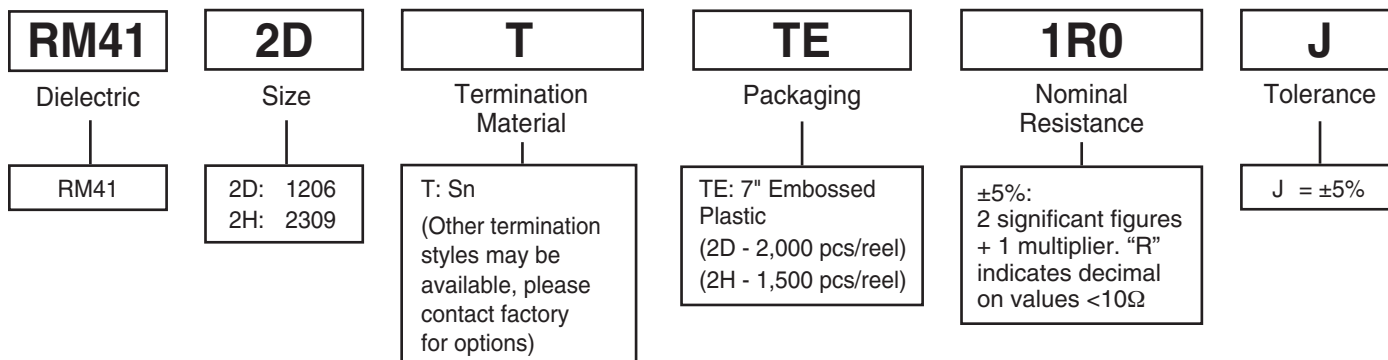
*T.C.R. noted for RN41 only

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3. Type Designation (continued)

The type designation shall be the following form:

New Type



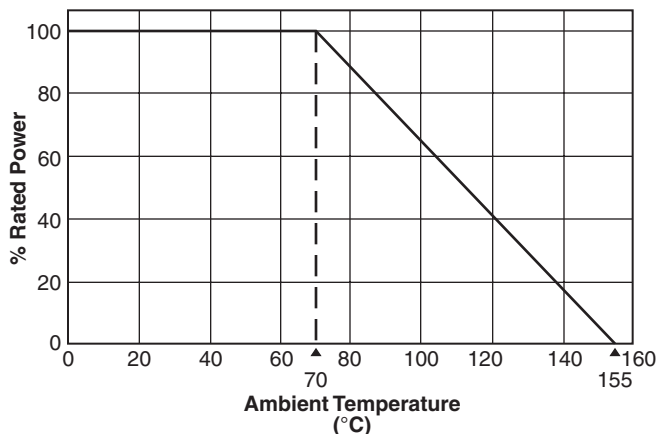
4. Applications and Ratings

Part Designation	Power Rating @ 70°C	T.C.R. (ppm/°C) Max.	Resistance Range					Absolute Maximum Working Voltage	Absolute Maximum Overload Voltage	Operating Temperature Range	
			(B±0.1%)	E-24, E-96 (C±0.25%)	E-24, E-96 (D±0.5%)	E-24, E-96 (F±1%)	E-24 (J±5%)				
RN412A	1/8W (.125W)	±100	—	—	—	100Ω-100KΩ	—	150V	200V	-55°C to +155°C	
RN412B	1/8W (.125W)	±25	—	100Ω-100KΩ	100Ω-604KΩ	—	—		300V		
		±50	—	—	—	10Ω-604KΩ	—				
RN412D	1/5W (.2W)	±50	—	—	—	—	—	250V	500V		
RN412E	1/4W (.25W)	±25	—	100Ω-100KΩ	100Ω-1MΩ	—	—		200V		400V
		±50	—	—	—	10Ω-1.0MΩ	—				
RN412ES	1/4W (.25W)	±25	10KΩ-100KΩ	100Ω-100KΩ	100Ω-604KΩ	—	—	250V	600V		
		±50	—	—	— —	1Ω-5.1MΩ	0.22Ω-0.91Ω				
RN412H	1/2W (.5W)	±200	—	—	—	—	0.22Ω-100KΩ	√P _x R	√P _x R×6.25		
RM412D	1/5W (.2W)	±350	—	—	—	—	0.22Ω-8.2Ω (E-12)	600V			
RM412H	1/2W (.5W)	±350	—	—	—	—					
RN413AS	1W	±50	—	—	—	1Ω-1MΩ	0.22Ω-0.91Ω				

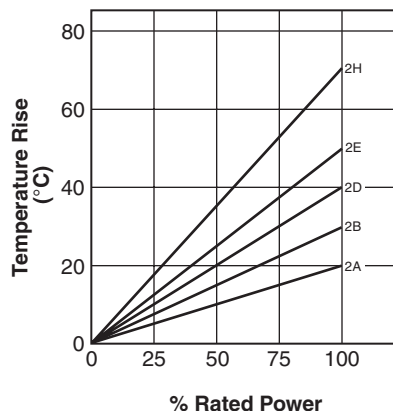
*1) Please contact KOA Speers for further information.

5. Environmental Application

Derating Curve



Surface Temperature Rise



6. Performance Characteristics

Parameter	Maximum $\Delta R \pm(\% + 0.05\Omega)$	Test Method
Thermal Shock	$\pm 0.5\%$	MIL-STD-202, Method 107, -55°C to +155°C, 5 cycles
Low Temperature Exposure	$\pm 0.2\%$	MIL-R-55342 π 4.7.4, 1 Hour @ -55°C
High Temperature Exposure	$\pm 1.0\%$ RN, $\pm 2.0\%$ RM	MIL-R-55342 π 4.7.6, 100 hours @ 155°C
Short Time Overload	$\pm 0.5\%$	MIL-R-55342 π 4.7.5, 2.5 x RCWV for 5 seconds
Resistance to Solder Heat	$\pm 0.5\%$ RN, $\pm 1.0\%$ RM	MIL-R-55342 π 4.7.7, 260°C for 10 seconds
Pulse	$\pm 1.0\%$ RN, $\pm 2.0\%$ RM	2.5 x RCWV, not exceeding maximum overload voltage, 1 second ON, 25 seconds OFF, 10,000 cycles
Moisture Resistance	$\pm 1.0\%$ RN, $\pm 3.0\%$ RM	MIL-STD-202, Method 103, 40°C, 90 - 95% RH, 1000 hours
Life	$\pm 1.0\%$ RN, $\pm 3.0\%$ RM	MIL-STD-202, Method 108, 70°C, 1000 hours @ RCWV, 1.5 hr ON, 0.5 hr OFF
Dielectric Withstanding Voltage	2A 200V Minimum 2B 300V Minimum 2D 300V Minimum 2E 400V Minimum 2H 500V Minimum 3AS 600V Minimum	1 minute minimum MIL-STD-202, Method 301
Insulation Resistance	10,000 M Ω	—

* RCWV = Rated Continuous Working Voltage.

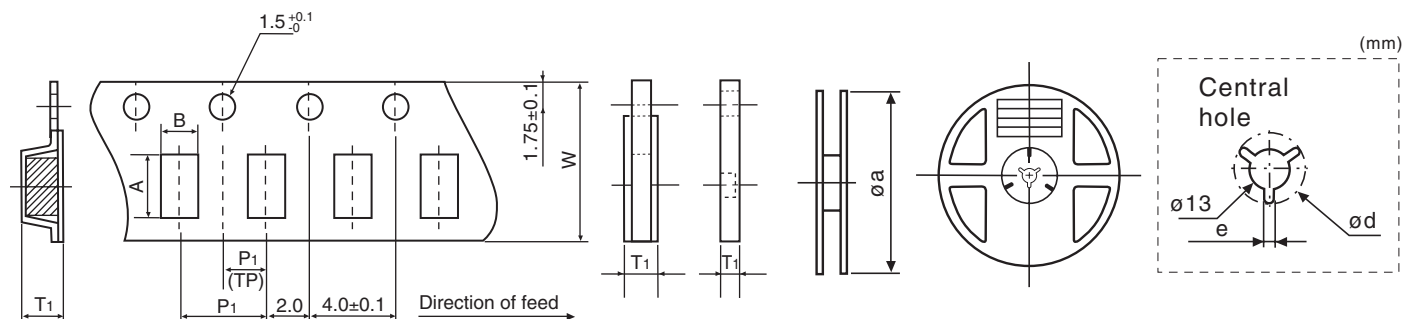
7. Packing

Packing box shall be marked with the following items.

- (1) Type, style and characteristic
- (2) Nominal resistance (3) Quantity
- (4) Lot number (5) Manufacturer's name

Type	Quantity	
	Bulk	Taping
2A	3,000 pcs./box	3,000 pcs./reel
2B, 2ES	3,000 pcs./box	3,000 pcs./reel
2D	2,000 pcs./box	2,000 pcs./reel
2E, 2H, 3AS	1,500 pcs./box	1,500 pcs./reel

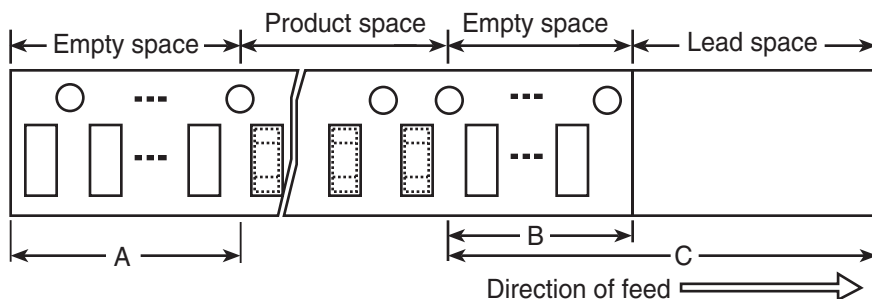
9. Taping Dimensions/Reel Dimensions



Dimensions in inches (mm)

Type	A	B	W	P ₁	T ₁	Øa	Ød	e
2A	.094 (2.4 ± 0.2)	.059 (1.5 ± 0.2)	.315 (8.0 ± 0.2)	.157 (4.0 ± 0.1)	.059 (1.45 ± 0.2)	7.01 (178)	.827 (21)	.079 (2)
2B, 2ES	.146 (3.7 ± 0.2)	.067 (1.7 ± 0.2)	.315 (8.0 ± 0.2)	.157 (4.0 ± 0.1)	.067 (1.7 ± 0.2)	7.01 (178)	.827 (21)	.079 (2)
2D	.146 (3.7 ± 0.2)	.067 (1.7 ± 0.2)	.315 (8.0 ± 0.2)	.157 (4.0 ± 0.1)	.067 (1.7 ± 0.2)	7.01 (178)	.827 (21)	.079 (2)
2E, 2H	.244 (6.2 ± 0.2)	.094 (2.4 ± 0.2)	.472 (12.0 ± 0.1)	.157 (4.0 ± 0.1)	.102 (2.6 ± 0.2)	7.01 (178)	.827 (21)	.079 (2)
3AS	.244 (6.2 ± 0.2)	.094 (2.4 ± 0.2)	.472 (12.0 ± 0.1)	.157 (4.0 ± 0.1)	.102 (2.6 ± 0.2)	10.01 (255)	.827 (21)	.079 (2)

10. Taping Configuration



Dimensions in inches (mm)

A min	B min	C min
3.93 (10 pitch)	1.38 (35 pitch)	11.40 (290 mm)