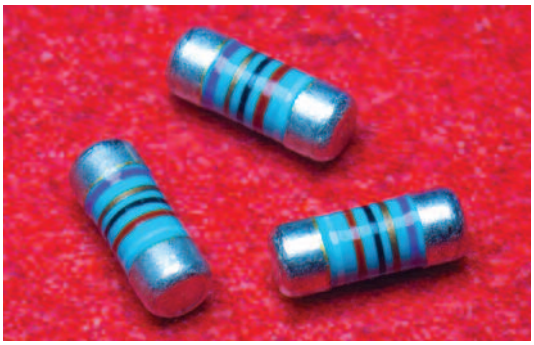
RN41, RM41, RD41, CC

melf type resistors

EU RoHS COMPLIANT

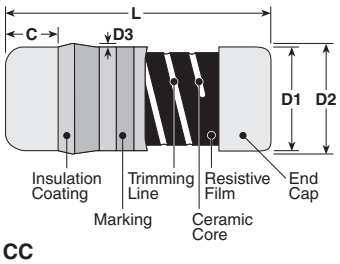


features

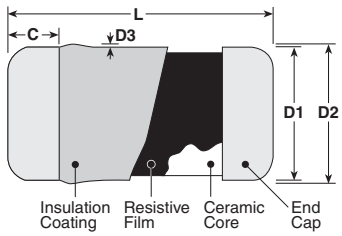
- Free direction for mounting due to cylindrical design
- High precision products (Resistance tolerance ±0.1% and T.C.R.±25×10^{-6}/K) available (RN41)
- The electrode strength is firm
- The noise characteristics is excellent
- Suitable for reflow, flow and iron solderings
- Products meet EU-RoHS requirements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

dimensions and construction

RN41, RM41, RD41



CC



Type (Inch/DIN Size Code)	Dimensions inches (mm) L	C	D1	D2 (max.)	D3 (max.)
2A (0805/0102)	.079±.004 (2.0±0.1)	.012 (0.3 min.)	.049±.002 (1.25±0.05)	.053 (1.35)	.003 (0.07)
2D (1206/0203)	.126±.008 (3.2±0.2)	.02 (0.5 min.)	.061±.006 (1.55±0.15)	.069 (1.75)	.004 (0.1)
2ES (1406/0204)	.138±.008 (3.5±0.2)	.02 ~ .035 (0.5 ~ 0.9)	.055±.004 (1.4±0.1)	.061 (1.55)	
CC12M (1406/0204)	.138±.008 (3.5±0.2)	.02 ~ .035 (0.5 ~ 0.9)	.055±.004 (1.4±0.1)	.061 (1.55)	.004 (0.1)
2E, 2H, 3AS (2309/0207)	.232±.008 (5.9±0.2)	.02 (0.5 min.)	.087±.004 (2.2±0.1)	.094 (2.4)	.006 (0.15)
CC25 (2309/0207)	.232±.008 (5.9±0.2)	.02 (0.5 min.)	.087±.004 (2.2±0.1)	.094 (2.4)	.006 (0.15)

ordering information

RN41	2ES	T	TE	1001	F	50*
Type	**Size**	**Termination Material**	**Packaging**	**Nominal Resistance**	**Tolerance**	**T.C.R. (ppm/°C)**
RN41 RM41 RD41	2A: 0.125W 2D: 0.2W 2ES: 0.25W, 0.4W 2E: 0.25W 2H: 0.5W 3AS: 1W	T: Sn	TE: 7" embossed plastic (2A, 2ES - 3,000 pieces/reel) (2D - 2,000 pieces/reel) (2E, 2H, 3AS - 1,500 pieces/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% G: ±2% J: ±5%	25: ±25 50: ±50 100: ±100 200: ±200 Nil: RM41 RD41

*T.C.R. noted for RN41 only

CC12M	T	TE
Type	**Termination Material**	**Packaging**
CC12M CC25	T: Sn	TE: 7" embossed plastic

For further information on packaging, please refer to Appendix A.

10/26/18

applications and ratings

Part Designation	Power Rating @ 70°C	Rated Ambient Temp.	Rated Terminal Part Temp.	T.C.R. (ppm/°C) Max.	Resistance Range					Max. Working Voltage	Max. Overload Voltage
					E-24, E-96 (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)	70°C	—	±100	—	—	—	100Ω-100kΩ	—	150V	200V
RN412D	1/5W (.2W)	70°C	—	±50	—	—	—	10Ω-604kΩ	—		300V
RN412ES	1/4W (.25W)	70°C	90°C	±25	43Ω-511kΩ	100Ω-100kΩ	100Ω-604kΩ	—	—	200V	400V
		70°C	90°C	±50	—	—	—	1Ω-5.11MΩ	0.22Ω-0.91Ω		
RN412ES	2/5W (.4W)*1*2	—	90°C	±50	—	—	—	1Ω-5.11MΩ	0.22Ω-0.91Ω	200V	400V
RN412H	1/2W (.5W)	70°C	—	±200	—	—	—	—	0.22Ω-100kΩ	250V	600V
RN413AS	1W*2	70°C	—	±50	—	—	—	1Ω-1MΩ	0.22Ω-0.91Ω	400V	600V
RM412D	1/5W (.2W)	70°C	—	±350	—	—	—	—	0.22Ω-8.2Ω (E-12)	—	—
RM412H	1/2W (.5W)	70°C	—	±350	—	—	—	—			
RD412ES	1/4W (.25W)	70°C	—	—*3	—	—	—	2.2 - 1.0M	2.2 - 1.0M	200V	400V
RD412E	1/4W (.25W)	70°C	—	—*3	—	—	—	1.0 - 2.2M	1.0 - 2.2M	300V	600V

Part Designation	Current Rating	Rated Ambient Temp.	Maximum Resistance
CC12M	2A	+70°C	20 mΩ or less
CC25	5A		

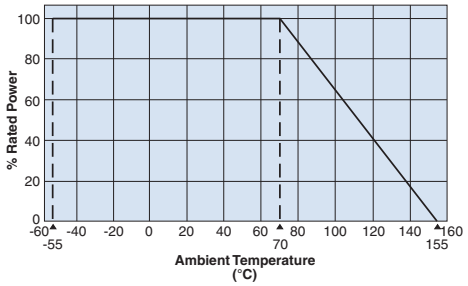
*1 A power rating is guaranteed at the terminal part temperature
If any questions should arise whether to use the "Rated Ambient Temperature" or the "Rated Terminal Part Temperature," please give priority to the "Rated Terminal Part Temperature." Prior to use and for more details refer to "Introduction of the derating curves on the terminal part temperature" in the beginning of the catalog.

*2 A power rating shall be guaranteed with a method shown in the Performance Characteristics. Please contact factory prior to use.

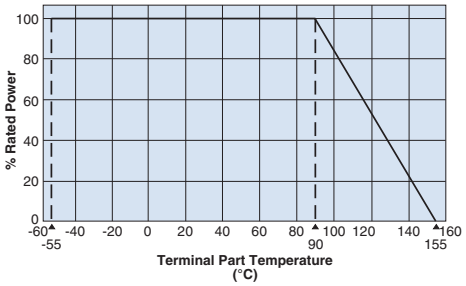
*3 Please contact factory for T.C.R. of RD41
Operating Temperature Range: -55°C to +155°C

environmental applications

Derating Curve



For resistors operated at an ambient temperature of 70°C or above, a power rating shall be derated in accordance with the above derating curve.



For resistors operated at a terminal part temperature of described for each size or above, a power rating shall be derated in accordance with the derating curve.

Please refer to "Introduction of the derating curve based on the terminal part temperature" in the beginning of our catalog before use.

Performance Characteristics

Parameter	Type	Requirement Δ R ±(%+0.05Ω) Limit	Typical	Test Method
Resistance	RN41 RM41 RD41	Within specified tolerance	—	25°C
T.C.R.	RN41 RM41 RD41	Within specified T.C.R.	—	+25°C/+125°C
Overload (Short time)	RN41	±0.5%	±0.3%	Rated voltage x 2.5 for 5 seconds or Max. overload voltage, whichever is lower, for 5 seconds
	RM41	±0.5%	±0.3%	
	RD41	±1%	±0.5%	
Intermittent Overload	RN41[1]	±1%	—	Rated voltage x 4 (RD41: 2Ax3) or Max. intermittent overload voltage, whichever is lower, 10,000 cycles
	RM41	±0.5%: 2E	—	
	RD41	±1%	—	
Resistance to Soldering Heat	RN41[2]	±2%: 2H (10Ω>) ±1%: 2H (10Ω≤) ±0.5%: 2A~2E	±1%: 2H (10Ω>) ±0.5%: 2H (10Ω≤) ±0.3%: 2A~2E	260°C ± 5°C, 10 seconds ± 1 second
	RD41	±1%	±0.5%	
Rapid Change of Temperature	RN41[2]	±0.5%: 2A~2E ±1%: 2H	±0.3%: 2A~2E ±0.7% 2H	-55°C (30 minutes), +125°C (30 minutes), 5 cycles
	RM41	±1%	±0.75%	
	RD41	±1%	±0.75%	
Moisture Resistance	RN41[1]	±1%: 2D, 2E ±3%: 2A; ±5%: 2H	±0.75%: 2D,2E ±1.5%: 2A; ±3%: 2H	40°C ± 2°C, 90 ~ 95% RH, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle
	RM41	±5%	±3%	
	RD41	±5%	±2.5%	
Endurance at 70°C	RN41[4]	±1%: 2D, 2E ±3%: 2A; ±5%: 2H	±0.5%: 2D, 2E ±1.5%: 2A; ±3%: 2H	70°C ± 2°C, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle
	RM41	±5%	±3%	
	RD41	±2%	±1%	
Low Temperature Exposure	RD41	±1%	±0.75%	-55°C, 1 hour
High Temperature Exposure	RN41[3]	±1%	±0.75%	155°C, 2 hours RN41: 2ES, 3AS: 155°C, 1000 hours
	RD41	±2%	±1%	

[1] 2ES: Does Not Apply [2] 2ES: Test Group D [3] 2ES: Test Group A [4] 2ES: Test Group C

CC

Parameter	Requirement Δ Real R Limit	Typical	Test Method
Resistance	20mΩ Max. after the test	7.5mΩ Max. after the test	25°C
Resistance to Solder Heat			260°C ± 5°C, 10 seconds ± 1 second
Rapid Change of Temperature			-55°C (30 minutes), +125°C (30 minutes), 5 cycles
Moisture Resistance			40°C ± 2°C, 90 - 95% RH, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle
Endurance at 70°C			70°C ± 2°C, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle

*Stability Class

Stability Class	Resistance Range	Limit Resistance Changing Attests (Test Group) A	B	C	D
0.25	10-332kΩ	±(0.25 + 0.05Ω)	±(0.50 + 0.05Ω)	±(0.25 + 0.05Ω)	±(0.05 + 0.05Ω)
0.5	1-<10Ω			±(0.50 + 0.05Ω)	±(0.10 + 0.05Ω)
1	0.22-<1Ω			±(1.00 + 0.05Ω)	±(0.25 + 0.05Ω)
2	>332kΩ-≤5.11MΩ	±(0.50 + 0.05Ω)	±(1.00 + 0.05Ω)	±(2.00 + 0.05Ω)	±(0.50 + 0.05Ω)

12/01/19