

THIN FILM AUTOMOTIVE CHIP RESISTORS

(RMFT SERIES)

(AUTOMOTIVE GRADE)

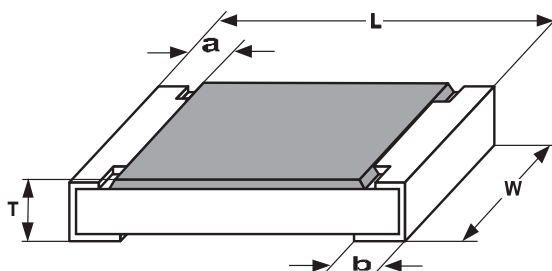
Features

1. Tolerance to 0.05%
2. Low TCR to $\pm 10\text{ppm}/^{\circ}\text{C}$
3. AEC-Q200 compliant
4. Halogen free and lead free
5. RoHS compliant

Applications

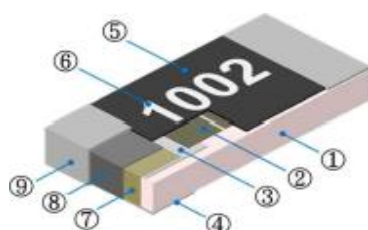
1. Industrial electronics
2. Communication devices
3. Measuring instrument
4. Converters

Dimensional Specifications



STYLE	Size code	Dimensions : mm				
		L	W	T	a	b
RMFT-04	0402	1.00 ± 0.10	0.50 ± 0.05	0.30 ± 0.05	0.20 ± 0.10	0.20 ± 0.10
RMFT-06	0603	1.60 ± 0.15	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
RMFT-10	0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.35 ± 0.20	0.40 ± 0.20
RMFT-18	1206	3.10 ± 0.15	1.60 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.50 ± 0.20

Construction



1. Alumina Substrates
2. Resistive Layer
3. Top Inner Electrode
4. Bottom Inner Electrode
5. Protective Overcoat
6. Marking
7. Side Inner Electrode
8. Nickel Barrier
9. Solder coating (Sn)



General Specification

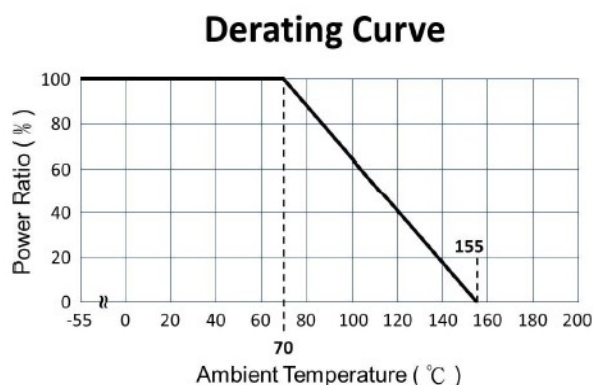
Type	Power Rating at 70°C	Max. Working Voltage	Max. Overload Voltage	T.C.R (PPM/°C)	Resistance Range(Ω)				
					±0.05%	±0.1%	±0.25%	±0.5%	±1%
RMFT-04 0402	1/16W	50V	100V	±10, ±15 ±25, ±50	49.9Ω~	10Ω~68KΩ			
					12KΩ	4.7Ω~220KΩ			
RMFT-06 0603	1/10W	75V	150V	±10, ±15 ±25, ±50	49.9Ω~	10Ω~332KΩ			
					30KΩ	4.7Ω~680KΩ			
RMFT-10 0805	1/8W	150V	300V	±10, ±15 ±25, ±50	49.9Ω~	10Ω~680KΩ			
					50KΩ	4.7Ω~1MΩ			
RMFT-18 1206	1/4W	200V	400V	±10, ±15 ±25, ±50	49.9Ω~	10Ω~1MΩ			
					100KΩ	4.7Ω~1.5MΩ			

- Operating Temperature Range: -55°C~+155°C.
- For non-standard parts, please contact our sales department.

Derating Curve

The operating temperature range : -55°C ~ +155°C

Power rating is in the case based on continuous full-load at ambient temperature of 70°C. For operation at ambient temperature in excess of 70°C, the load should be derated in accordance with figure of derating curve.



Rated Voltage

Resistance Range: $\geq 1\Omega$

Rated Voltage: the resistor shall have a DC continuous working voltage or a RMS AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating as determined formula as folling:

$$V = \sqrt{P \times R}$$

V = Rated voltage (V)
P = Rated power (W)
R = Nominal resistance (Ω)



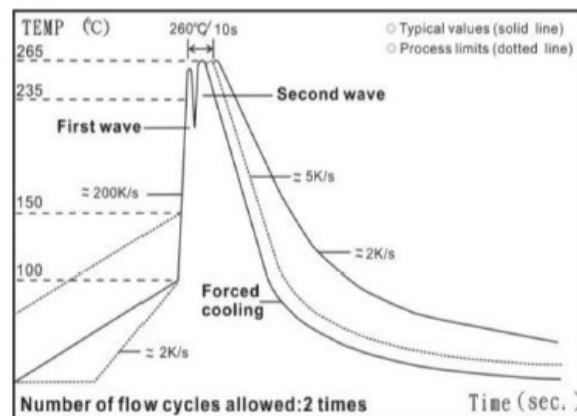
Reliability tests

Test Items	Test Method	Condition of Test	Requirement
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC 60115-1 4.8	AT +25/-55°C and +25/+125°C ,25°C is the reference temperature	Refer to standard Electrical Specifications
Short Time Overload	JIS-C-5201-1 4.13 IEC 60115-1 4.13	2.5 times RCWV or Max. overload voltage whichever is less for 5 sec.	$\pm(0.1\% + 0.05\Omega)$ No visual damage
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260 $\pm$ 5°C for 30 seconds	> 95% Coverage No visual damage
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1-4.18	260 $\pm$ 5°C for 10 seconds	$\pm(0.1\% + 0.05\Omega)$ No visual damage
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Apply 100VDC for 1 minute	$\geq 10G\Omega$
Temperature Cycling	JESD22 Method JA-104	1000 Cycles (-55°C to +125°C) Measurement at 24 $\pm$ 4 hours after test conclusion. 30min maximum dwell time at each temperature extreme.	$\pm(0.3\% + 0.05\Omega)$ No visual damage
Resistance to Solvent	MIL-STD-202 Method 215	Add Aqueous wash chemical - OKEM clean or equivalent	$\pm(0.1\% + 0.05\Omega)$ No visual damage
Biased Humidity	MIL-STD-202 Method 103	1000 hours; 85°C /85% RH, 10% of operating power. Measurement at 24 $\pm$ 4 hours after test conclusion	$\pm(0.3\% + 0.05\Omega)$
High Temperature Exposure (Storage)	MIL-STD-202 Method 108	1000 hrs.@T=155°C . Unpowered Measurement at 24 $\pm$ 4 hours after test conclusion.	$\pm(0.3\% + 0.05\Omega)$
Operation Life	MIL-STD-202 Method 108	Condition D steady state TA=125°C at derated power. Measurement at 24 $\pm$ 4 hours after test conclusion.	$\pm(0.3\% + 0.05\Omega)$
External Visual	MIL-STD-883 Method 2009	Electrical test not required. Inspect device construction, marking and	No Visual damage
Mechanical Shock	MIL-STD-202 Method 213	Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration(D) is 6(ms).	$\pm(0.1\% + 0.05\Omega)$
Vibration	MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000H	$\pm(0.1\% + 0.05\Omega)$
ESD	AEC-Q200-002 or ISO/DIS 10605	Human body model 0402 : 400V / 0603 : 1000V 0805 : 1500V / 1206 : 2000V	$\pm(0.5\% + 0.05\Omega)$
Solderability	J-STD-002	(1) 4 hrs 155°C dry heat (2) 245 $\pm$ 5°C 3 sec.	>95% Coverage No Visual damage
Terminal Strength (SMD)	AEC Q200-006	Pressurizing force for 60 seconds 0402 / 0603 : 8N ; 0805 / 1206 : 17.7N	No broken
Board Flex	AEC Q200-005	Beading once for 60 seconds 0402/0603/0805/1206 : 3mm	$\pm(0.1\% + 0.05\Omega)$
Sulfuration Test (FoS)	ASTM B809-95 ANSI/EIA-977	105 $\pm$ 2°C, no power rating for 1000hrs	$\pm(1.0\% + 0.05\Omega)$

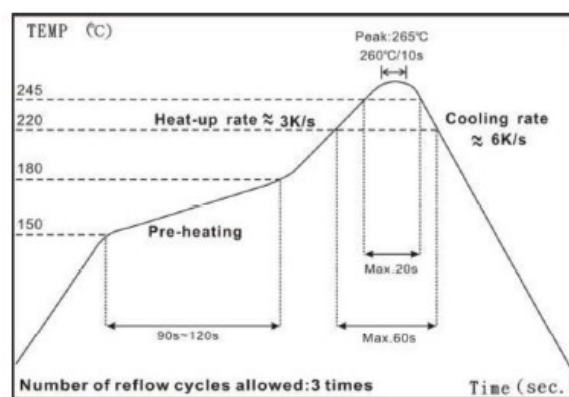


Recommended Customer Soldering Parameters

◎ Wave Solder Temperature Condition



◎ Solder reflow Temperature condition



Rework temperature (hot air equipment): 350, 3~5 seconds

Recommended reflow methods

- IR, vapor phase oven, hot air oven
- if reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Parts Number System

RMFT -	18 -	1004	C	R	E
Type	Size	Resistance	Tolerance	Standard Packing	TCR/ppm°C
RMFT	04=0402	0R = 0R00	A = ±0.05%	R=Paper	T= ±10ppm
Automotive	06=0603	1R = 1R00	B = ±0.1%	tape reel	H= ±15ppm
Grade	10=0805	10R = 10R0	C = ±0.25%	5Kpcs/Reel	E= ±25ppm
Thin Film	18=1206	100R = 1000	D = ±0.5%		C= ±50ppm
Chip		1MR = 1004	F = ±1%		
Resistor					

