ULTRA-LOW POWER SMD METAL STRIP RESISTORS

(RFL SERIES)

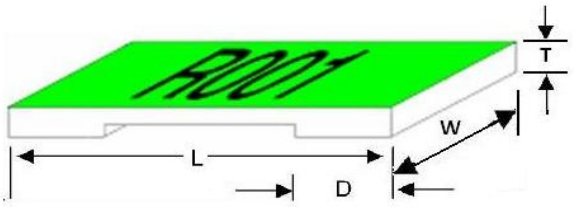
SCOPE

The specification covers 1206, 2010 and 2512

Higher power low resistance current sensing metal strip resistors.

DIMENSIONS

TYPE A



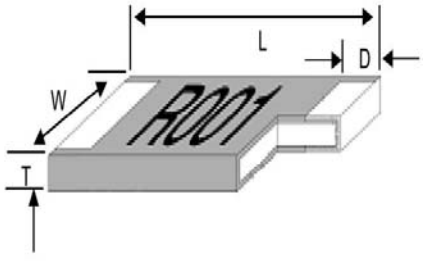
*** IR reflow soldering only**

Style	Resistance	L (mm)	W(mm)	D(mm)	T (mm)	
RFL-18A 1206	R001	3.20±0.25	1.60±0.09	1.10±0.25	0.6±0.2	Manganin
	R002~R003	3.20±0.25	1.60±0.09	0.60±0.25	0.6±0.2	Manganin
	R004~R006	3.20±0.25	1.60±0.09	1.10±0.25	0.6±0.2	Aluchrom
	R007~R009	3.20±0.25	1.60±0.09	0.90±0.25	0.6±0.2	Aluchrom
	R010	3.20±0.25	1.60±0.09	0.60±0.25	0.6±0.2	Aluchrom
RFL-22A 2010	R001	5.08±0.25	2.54±0.35	1.84±0.25	0.6±0.2	Manganin
	R002	5.08±0.25	2.54±0.35	1.54±0.25	0.6±0.2	Manganin
	R003	5.08±0.25	2.54±0.35	1.04±0.25	0.6±0.2	Manganin
	R004~R005	5.08±0.25	2.54±0.35	1.84±0.25	0.6±0.2	Aluchrom
	R006~R008	5.08±0.25	2.54±0.35	1.54±0.25	0.6±0.2	Aluchrom
	R009~R010	5.08±0.25	2.54±0.35	1.29±0.25	0.6±0.2	Aluchrom
RFL-24A 2512	R0005	6.35±0.25	3.00±0.20	2.68±0.25	0.6±0.2	Manganin
	R00075	6.35±0.25	3.00±0.20	2.48±0.25	0.6±0.2	Manganin
	R001	6.35±0.25	3.00±0.20	1.93±0.50	0.6±0.2	Manganin
	R002~R003	6.35±0.25	3.00±0.20	1.18±0.25	0.6±0.2	Manganin
	R004	6.35±0.25	3.00±0.20	2.18±0.25	0.6±0.2	Aluchrom
	R005, R006	6.35±0.25	3.00±0.20	1.93±0.25	0.6±0.2	Aluchrom
	R008~R015	6.35±0.25	3.00±0.20	1.18±0.15	0.6±0.2	Aluchrom

R0005 and R00075 marking on body M50 and M75

TYPE B

*** Wave or IR reflow Soldering**



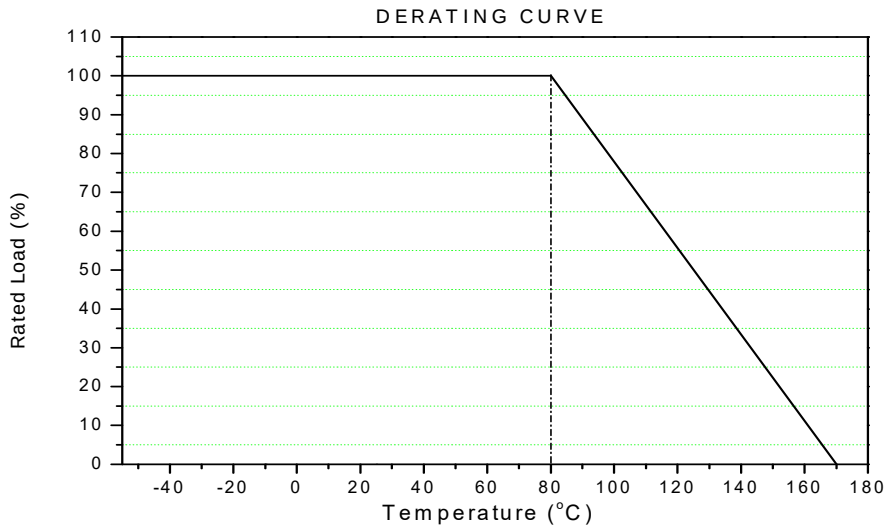
Series	L(mm)	W(mm)	D(mm)	T(mm)
RFL-10B 0805	2.00±0.15	1.2±0.15	0.45±0.15	0.325±0.2
RFL-18B 1206	3.10±0.20	1.65±0.20	0.6±0.2	0.6±0.2
RFL-24B 2512	L(mm)	W(mm)	D(mm)	T(mm)
R003	6.35±0.254	3.18±0.254	0.8±0.2	0.6±0.2
R005- R050	6.35±0.254	3.18±0.254	0.8±0.2	0.6±0.2
RFL-59B 5931	L (mm)	W(mm)	D(mm)	T(mm)
R002, R003	15.0±0.20	7.8±0.20	0.7±0.20	3.5±0.2
R005				

RoHS compliant

CINETECH SYMBOL OF QUALITY

POWER TEMPERATURE DERATING CURVE

Power ratings are based on continuous full load operation at rated ambient temperature of 80°C. For resistors operated at ambient temperature in excess of 80°C, the maximum load shall be derated in accordance with the following curve.



RATED VOLTAGE

The direct or alternationg voltage for the rated power can be calculated from the following formula but must not exceed the maximum voltage.

$V = \sqrt{P \times R}$	**Where,** **V= rated voltage (V)** **P= rated power (W)** **R= rated resistance (Ω)**

CHARACTERISTICS

Temperature coefflcient of resistnce(TCR)

Test Method

$TCR\ (ppm/^{o}C) = \left[\frac{(R_2 - R_1)}{R_1 (T_2 - T_1)} \right] \times 10^{6}$	**Where,** **R_1= resistance at room temperature** **R_2= resistance at –55°C or 125°C** **T_1=room temperature** **T_2=-55°C or 125°C**

Performance

TYPE A

Series/size Range (mΩ)	RFL-18A 1206		RFL-22A 2010	
	R001	R010	R001	R010
Max. Working Current (A)	32A	10A	39A	12A
Max. Overload Current (A)	71A	22A	71A	27A
TCR (ppm/˚C)	± 50	± 50	± 50	± 50
Power Rating (W)	1W	1W	1.5W	1.5W
Tolerance (%)	±1, 5	±1, 5	±1, 5	±1, 5

Series/size Range (mΩ)	RFL-24A 2512								
	R0005	R00075	R001	R002	R003	R004 - R006		R007 - R015	
Max. Working Current (A)	77.5	63.3	54.8	38.7	31.6	25	20.4	16.9	7.1
Max. Overload Current (A)	173.2	141.4	122.5	86.6	70.7	55.9	45.6	37.8	15.8
TCR (ppm/˚C)	±100		±50		±75	±50			
Power Rating (W)	3					2.5		2, 1	
Tolerance (%)	± 1, 5								

TYPE B

Series/size Range (mΩ)	RFL-10B 0805		RFL-18B 1206		RFL-24 2512			RFL-59B 5931
	5,10,20,		5,10,15,20,25		3, 5~50			2,3 and 5
Max. Working Current (A)	71mv	100mv	112mv	158mv	224mv			158mv
Max. Overload Current (A)	158mv	224mv	250mv	354mv	500mv			345mv
Power Rating (W)	1/4W	1/2W	1/2W	1W	1W	2W	3W	5w
TCR (ppm/˚C)	± 100		± 70		± 50, ± 100			± 70
Tolerance (%)	± 1, 5 %		± 1, 5 %		± 1, 5 %			± 1, 5 %

Parts Number System

RFL-24		A	T	R005	F	K
Size		Type	Power Rating	Resistance	Tolerance	packaging
RFL-18	1206	A or B	B-0.5W		J±5%	R= Tape reel
RFL-22	2010		T-1W		F±1%	K=Embossed
RFL-24	2512		D-1.5W			Plastic reel
RFL-59	5931		K-2W			B= Bulk pack
			W-2.5W			
			H-3W			
			M-5W			

Short Time Overload

Test method

5 times the rated power is applied to the resistor and the change in resistance is measured after 30mins.

Performance

△R< ±1%

Load Life

Test Method

The resistor is placed in a chamber for 1000hrs at 70 ± 2°C. The rated voltage is applied to the resistor(duty cycle: 90mins ON,30mins OFF). The change in resistance is measured 60mins ater removal from test chamber.

Performance

△R< ±1%

Solderability

Test Method

The resistor is immersed in solder bath at 260 ± 5°C for 2 ±0.5 secs.

Performance

Coverage of 95% of the surface immersed.

High Temperature Storage

Test Method

The resistor is placed in a constant temperature-humidity chamber at 170 ± 2°C for 1000hrs and the resistance is measured 60 mins after the end of the cycle.

Performance

△R < ±1%

Thermal Shock

Test method

The resistor is kept at a temperature of -55°C for 15mins and the temperature is then raised to 150°C and the resistor is held in this state for another 15mins. This is repeated for 1000 cycles. The chgane in resistance is then measured 2hrs after the completion of 1000 cycles.

Performance

△R < ±1%

Solder Heat

Test method

The resistor is immersed in solder bath at 260 ± 5°C for 10± 1secs and the resistance is measured 1hr after the test.

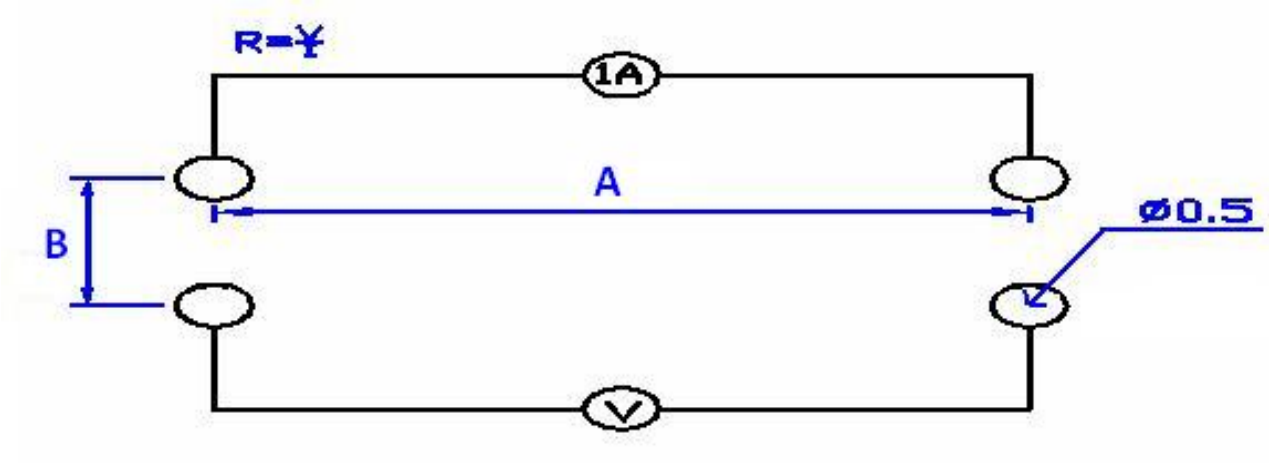
Performance

△R < ±1%

Measurements

wire precision measurement

Equipment: ADEX AX-1152D DC Low Ohm Meter
Excitation Current: 3A (0.5mΩ~1.5mΩ)
1A (2mΩ~20mΩ)

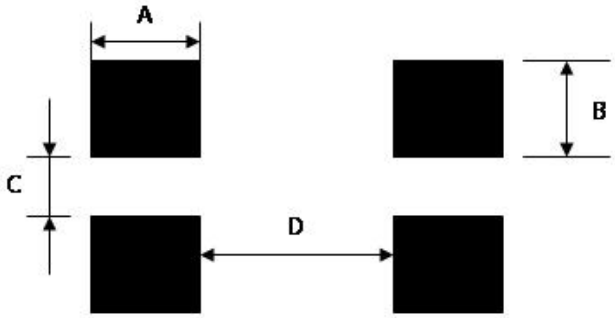


unit:mm

Dimension	2512	2010	1206
A	5.4mm	4.32mm	2.6mm
B	1.5mm	1.2mm	1.2mm

4-wire pad layout (recommended for precision current sensing)

Note: No circuits between pads to avoid short circuit



unit:mm

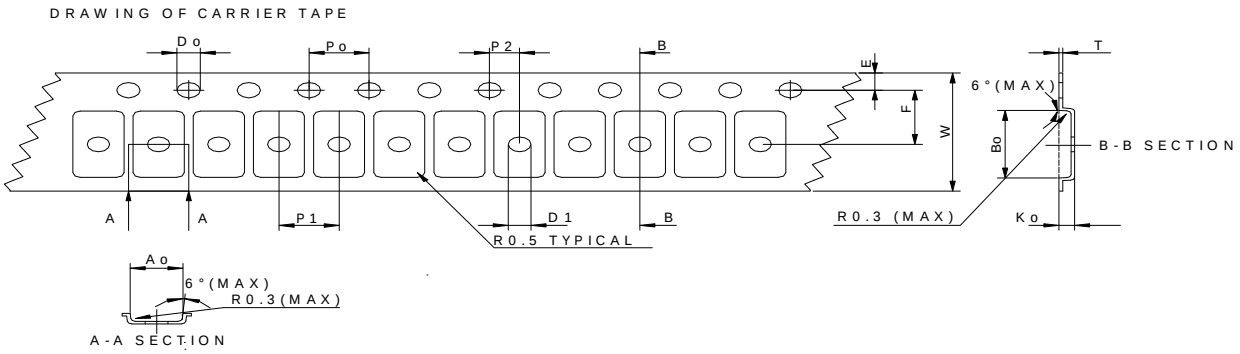
		R001	R002~R003	R004~R006	R007~R009	R010	
1206	A	1.55	1.05	1.55	1.35	1.05	
	B	0.7	0.7	0.7	0.7	0.7	
	C	0.5	0.5	0.5	0.5	0.5	
	D	0.55	1.55	0.55	0.95	1.55	

		R001	R002	R003	R004~R005	R006~R008	R010
2010	A	2.29	1.99	1.49	2.29	1.99	1.74
	B	1.04	1.04	1.04	1.04	1.04	1.04
	C	0.8	0.8	0.8	0.8	0.8	0.8
	D	0.95	1.55	2.55	0.95	1.55	2.05

		R0005	R00075	R001	R002-R003	R004	R005-R006	R008-R015
2512	A	3.13	2.93	2.38	1.63	2.63	2.38	1.63
	B	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	C	1	1	1	1	1	1	1
	D	0.52	0.94	2.04	3.54	1.54	2.04	3.54

Packaging

Emboss Plastic Tape Specifications



Unit : mm

Dimension	Ao	Bo	Ko	Po	P1	P2	T
2512	3.4±0.1	6.75±0.1	0.8±0.1	4.0±0.1	4.0±0.1	2.0±0.05	0.25±0.1
	E	F	Do	D1	W	10Po	
	1.75±0.1	5.5±0.05	1.55±0.05	1.5(MIN)	12.0±0.3	40.0±0.2	
Dimension	Ao	Bo	Ko	Po	P1	P2	T
2010	2.85±0.1	5.55±0.1	0.85±0.1	4.0±0.1	4.0±0.1	2.0±0.05	0.25±0.1
	E	F	Do	D1	W	10Po	
	1.75±0.1	5.5±0.05	1.55±0.05	1.5(MIN)	12.0±0.3	40.0±0.2	
Dimension	Ao	Bo	Ko	Po	P1	P2	T
1206	1.9±0.1	3.6±0.1	0.87±0.1	4.0±0.1	4.0±0.1	2.0±0.05	0.2±0.05
	E	F	Do	D1	W	10Po	
	1.75±0.1	5.5±0.05	1.55±0.05	1.5(MIN)	12.0±0.3	40.0±0.2	

Notice:

1. **The cumulative tolerance of 10 sprocket hole pitch is ±0.2mm.**
2. **Carrier camber shall be not more than 1mm per 100mm through a length of 250mm.**
3. **Ao & Bo measured 0.3mm from the bottom of the packet**
4. **ko measured at a point on the inside bottom of the packet to the top surface of the carrier. For 0.5mΩ and 0.75mΩ, ko=1.35(+ 0.1, - 0.05) mm**
5. **Pocket position relative to sprocket hole is measured as the true position of the Pocket and not the pocket hole.**