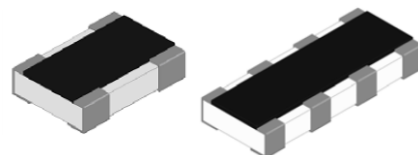


**Features:**

- Thick film resistor element
- Ideal SMD substitute for leaded networks
- Flat termination for better solderability, reliability and lower cost
- Zero ohm jumper available
- RoHS compliant
- Halogen free
- REACH compliant



**Electrical Specifications**

Type / Code (# of Elements/Circuit Type)	Number of Resistors	Power Rating (W) (per element) @ 70°C	Maximum Working Voltage (V) <sup>(1)</sup>	Maximum Overload Voltage (V)	TCR (ppm/°C)	Ohmic Range (Ω) and Tolerance	
						1%	5%
RAF052D	2	0.031	12.5	25	± 300 ± 200	-	3 - 9.1 10 - 1M
RAF054D	4	0.031	12.5	25	± 200	10 - 1M	

(1) Lesser of  $\sqrt{P \cdot R}$  or maximum working voltage

**Schematics**

Isolated Circuit - 2D	Isolated Circuit - 4D	RAF - 2 Resistors / 4 Terminations (D)	RAF - 4 Resistors / 8 Terminations (D)

**Mechanical Specifications**

Type / Code (# of Elements/ Circuit Type)	Weight (g) (1000 pcs)	L Body Length	W Body Width	H Body Height	A Termination Width	B Element Spacing	C Top Termination	Y Bottom Termination	Unit
RAF052D	0.500	0.031 ± 0.004 0.80 ± 0.10	0.024 ± 0.004 0.60 ± 0.10	0.014 ± 0.004 0.35 ± 0.10	0.012 ± 0.004 0.30 ± 0.10	0.020 ± 0.004 0.50 ± 0.10	0.006 ± 0.004 0.15 ± 0.10	0.006 ± 0.004 0.15 ± 0.10	inches mm
RAF054D	0.833	0.055 ± 0.004 1.40 ± 0.10	0.024 ± 0.004 0.60 ± 0.10	0.014 ± 0.004 0.35 ± 0.10	0.008 ± 0.004 0.20 ± 0.10	0.016 ± 0.004 0.40 ± 0.10	0.004 ± 0.003 0.10 ± 0.07	0.006 ± 0.002 0.15 ± 0.05	inches mm

**Performance Characteristics**

Test	Test Method	Test Condition	Test Specification		
			± 1%	± 5%	Jumper
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds	± (1.0% + 0.05 Ω)	± (2.0% + 0.05 Ω)	< 50m Ω
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Max. Overload Voltage for 1 minute	≥ 10G		
Endurance	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	70±2°C, RCWV for 1000 hours with 1.5 hours "ON" and 0.5 hours "OFF"	± (2.0% + 0.10 Ω)	± (3.0% + 0.10 Ω)	< 50m Ω CN-21/41: < 100 mΩ
Damp Heat with Load	JIS-C-5201-1 4.24 IEC-60115-1 4.24	40 ± 2°C, 90 ~ 95% R.H., RCWV for 1000 hours with 1.5 hours "ON" and 0.5 hours "OFF"	± (2.0% + 0.10 Ω)	± (3.0% + 0.10 Ω)	< 50m Ω
Dry Heat	JIS-C-5201-1 4.23 IEC-60115-1 4.23.2	at +125 / +155°C for 1000 hours	± (1.0% + 0.05 Ω)	± (1.5% + 0.10 Ω) CN-21/41: ± (3.0% + 0.10 Ω)	< 50m Ω CN-21/41: < 100m Ω

### Performance Characteristics (cont.)

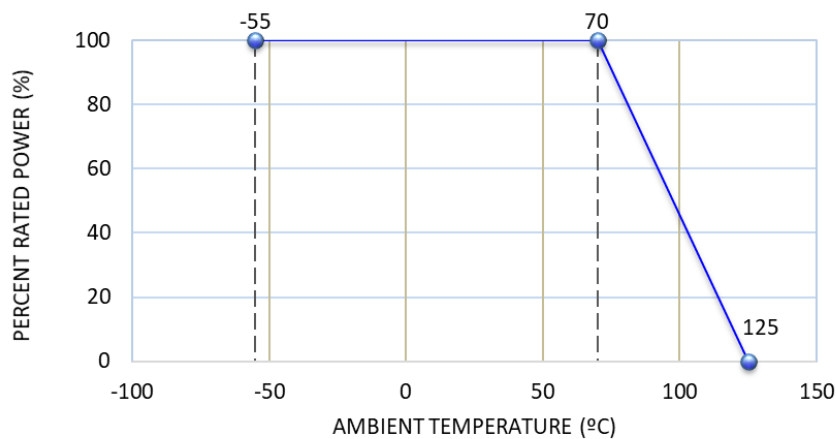
Test	Test Method	Test Condition	Test Specification		
			± 1%	± 5%	Jumper
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once for 5 seconds with 3 mm	± (1.0% + 0.05 Ω)	± (1.0% + 0.05 Ω)	< 50m Ω
Solderability	JIS-C-5201-1 4.17 IEC-60115-1 4.17	245 ± 5°C for 3 seconds	95 % min. coverage		
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260 ± 5°C for 10 seconds	± (0.5% + 0.05 Ω)	± (1.0% + 0.05 Ω)	< 50m Ω
Voltage Proof	JIS-C-5201-1 4.7 IEC-60115-1 4.7	1.42 times Max. Operating Voltage for 1 minute	No breakdown or flashover		
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260 ± 5°C for 30 seconds	Individual leaching area ≤ 5% Total leaching area ≤ 10%		
Rapid Change of Temperature	JIS-C-5201-1 4.19 IEC-60115-1 4.19	-55°C to +125 / +155°C, 5 cycles	± (0.5% + 0.05 Ω)	± (1.0% + 0.05 Ω)	< 50m Ω

RCWV (Rated Continuous Working Voltage) =  $\sqrt{P \cdot R}$  or Max. Operating Voltage whichever is lower.

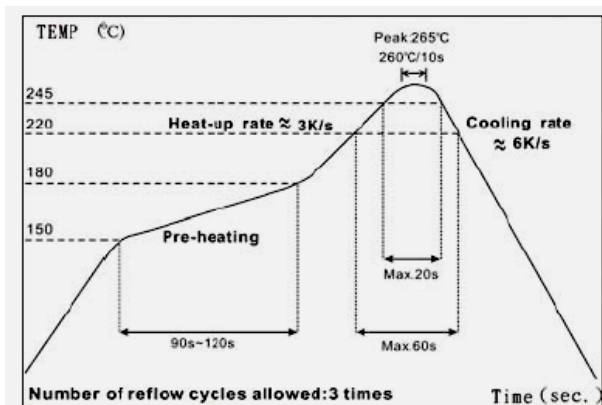
Operating Temperature Range: -55°C +125°C, 25°C is the reference temperature

Storage Temperature: 25 ± 3°C; Humidity < 80% RH

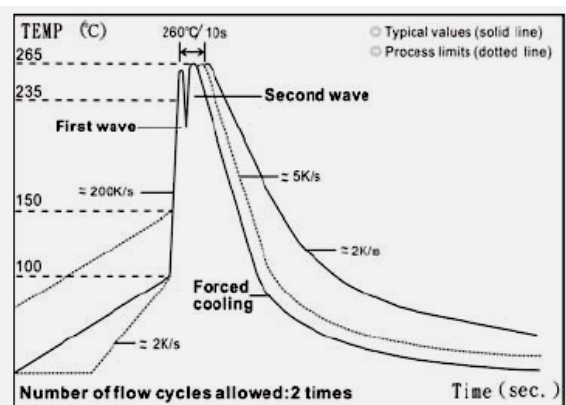
### Power Derating Curve:



### Soldering Condition



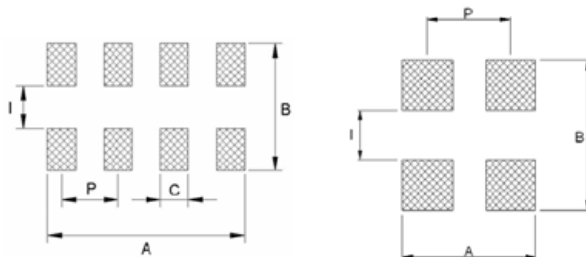
#### IR Reflow Soldering



#### Wave Soldering (Flow Soldering)

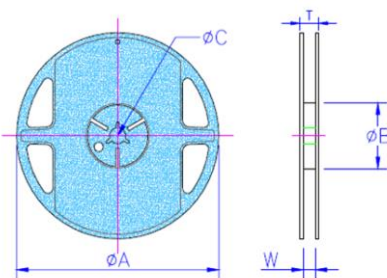
- (1) Time of IR reflow soldering at maximum temperature point 260°C: 10 seconds
- (2) Time of wave soldering at maximum temperature point 260°C: 10 seconds
- (3) Time of soldering iron at maximum temperature point 410°C: 5 seconds

### Recommended Pad Layout



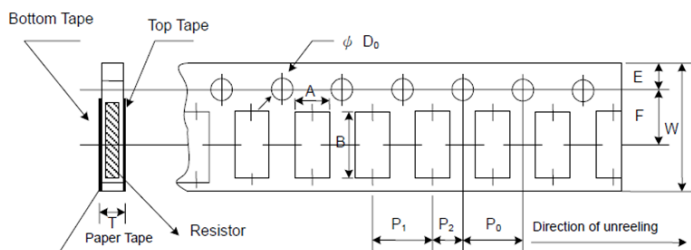
Type/Code	A	B	C	I	P	Unit
RAF052D	0.031 0.80	0.035 0.90	-	0.012 0.30	0.020 0.50	inches mm
RAF054D	0.055 1.40	0.035 0.90	0.008 0.20	0.012 0.30	0.016 0.40	inches mm

### Packaging Information



Type/Code	Packaging	Quantity	Tape Width	Reel Diameter	A	B	C	W	T	Unit
RAF052D	Paper	10000	0.315	7.000	7.028 ± 0.059	2.362 ± 0.039	0.512 ± 0.008	0.354 ± 0.020	0.492 ± 0.020	inches
RAF054D			8.00	177.80	178.50 ± 1.50	60.00 ± 1.00	13.00 ± 0.20	9.00 ± 0.50	12.50 ± 0.50	mm

### Paper Tape Specifications



Type/Code	A	B	W	E	F	P0	Unit
RAF052D	0.030 ± 0.002 0.77 ± 0.05	0.038 ± 0.002 0.97 ± 0.05	0.315 ± 0.008 8.00 ± 0.20	0.069 ± 0.004 1.75 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	inches mm
RAF054D	0.030 ± 0.002 0.77 ± 0.05	0.062 ± 0.002 1.57 ± 0.05	0.315 ± 0.008 8.00 ± 0.20	0.069 ± 0.004 1.75 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	inches mm
Type/Code	P1	P2	D0	T	Unit		
RAF052D	0.079 ± 0.002 2.00 ± 0.05	0.079 ± 0.002 2.00 ± 0.05	0.059 ± 0.004 1.50 ± 0.10	0.020 ± 0.004 0.50 ± 0.10	inches mm		
RAF054D	0.079 ± 0.002 2.00 ± 0.05	0.079 ± 0.002 2.00 ± 0.05	0.059 ± 0.004 1.50 ± 0.10	0.020 ± 0.004 0.50 ± 0.10	inches mm		

## RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status						
Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
RAF	Thick Film Surface Mount Chip Resistor Array Flat Terminations	SMD	YES(1)	100% Matte Sn over Ni	Jul-04	04/27

Note (1): RoHS Compliant by means of exemption 7c-I.

## "Conflict Metals" Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the "conflict region" of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

## Compliance to "REACH"

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, "The Registration, Evaluation, Authorization and Restriction of Chemicals", otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

## Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

## How to Order

