

## CRF Series Datasheet

Precision Fusible Safety Wirewound Resistors | Axial and SMD Version  
 Ceramic core | Flame retardant coating | UL1412 Recognized (file E330640)

### APPLICATIONS

- Industrial
- Consumer & Electronics
- Power & Energy
- Computer & Peripherals
- Automotive

### FEATURES

- Precision Type
- "Z" preforming ; Other preforming available
- UL approval, file E330640
- High pulse load up to 6[KV]
- 240[V] fusing application
- RoHS Compliant

### ORDERING CODE - Example

New SAP Part Nr.:

<b>CRF</b>	<b>300</b>	<b>J</b>	<b>T</b>	<b>-</b>	<b>73-</b>	<b>150R</b>	<b>UL</b>
Serie	* Power rating	Tol.	Pack-Code	TCR	Forming type	R Value	Special
		J = ±5%	T = Tape (ammo pack)	- Base on spec.	52- Inner Taping dimension or 73- Inner Taping dimension ZB- Z version		UL = UL Version YY = Standard

Historical VTM Part Nr.:

<b>CRF254 - 8</b>	<b>5</b>	<b>T</b>	<b>150R</b>
Type	Tol.	Pack-Code	R Value
	±5% = J	T = Tape (ammo pack)	

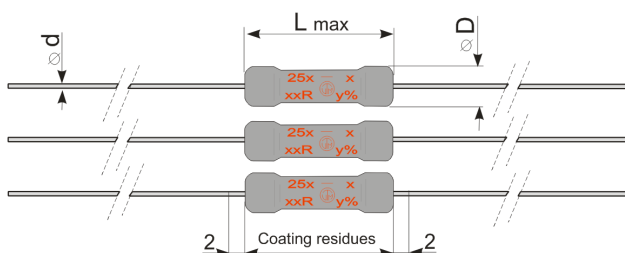
  

<b>RZS4</b>	<b>6720</b>	<b>J</b>	<b>K</b>	<b>-</b>	<b>13</b>	<b>150R</b>
Type	Size	Tol.	K = Blister tape reel	TC	Reel diam.	R Value

### ELECTRICAL SPECIFICATIONS

Type		CRF110	CRF200	CRF250	CRF300	CRF400	CRF500	
Historical Part Number	AXIAL	Standard	CRF251-4	CRF252-4	CRF253-4	CRF254-4	CRF256-4	CRF257-4
		UL	CRF251-8	CRF252-8	CRF253-8	CRF254-8	CRF256-8	CRF257-8
Nominal Power Rating	SMD		RZS1	RZS2	RZS3	RZS4	RZS6	-----
	* P <sub>40</sub> P <sub>70</sub>	[W]	1,1 1,0	2,0 1,8	2,5 2,3	3,0 2,7	4,0 3,6	5,0 4,5
Resistance Range	[Ω]	1R ... 100R	1R ... 240R	1R ... 330R	1R ... 470R	1R ... 330R	1R ... 330R	
E-Series (preferred)		E24 (Other upon request)						
Tolerances	±[%]	J = 5%						
Temperature Coefficient	±[10 <sup>-6</sup> K <sup>-1</sup> ]	120 ±50						
Working Temperature Range	[°C]	-55 ... +350						
Thermal Resistance	[KW <sup>-1</sup> ]	280	155	122	104	78	62	
Max. Working Voltage	[V] <sub>RMS</sub>	$\sqrt{P_{70} \times R}$						
Dielectric Withstanding Voltage IEC115-1 clause 4.7 (1[min])	[V] <sub>RMS</sub>	500						

### DIMENSIONS [mm]



Type	Historical P/N:	L max.	Ø D max. *	Ø d ±0,05
<b>CRF110</b>	CRF251-4 / -8	9,0	3,0	0,65
<b>CRF200</b>	CRF252-4 / -8	9,7	4,0	0,80
<b>CRF250</b>	CRF253-4 / -8	14,5	4,5	0,65
<b>CRF300</b>	CRF254-4 / -8	12,6	6,0	0,80
<b>CRF400</b>	CRF256-4 / -8	17,0	6,0	0,80
<b>CRF500</b>	CRF257-4 / -8	18,0	8,5	0,80

\*R < 10R D max.+1

# CRF Series Datasheet

## PERFORMANCE DATA

Type		CRF110	CRF200	CRF250	CRF300	CRF400	CRF500	
Historical Part Number	AXIAL	Standard	CRF251-4	CRF252-4	CRF253-4	CRF254-4	CRF256-4	CRF257-4
		UL	CRF251-8	CRF252-8	CRF253-8	CRF254-8	CRF256-8	CRF257-8
	SMD	RZS1	RZS2	RZS3	RZS4	RZS6	-----	
Derating Linear	[°C]	70...350 (0W)						
Climatic Category		55/350/56						
Failure Rate <i>(Total, <math>\vartheta</math>, max, 60[%] cont. lev.)</i>	[10 <sup>-9</sup> h <sup>-1</sup> ]	appr. 10 depends on value						
Endurance <i>IEC60115-1 clause 4.25 (P<sub>70</sub> @ 70[°C], 1000[h])</i>	±[%]	5,0						
Damp Heat, Steady State <i>IEC60115-1 clause 4.24 (40[°C], 93[% r.h.], 56[d])</i>	±[%]	5,0						
Climatic Sequence <i>IEC60115-1 clause 4.23 (260<sup>±2</sup>[°C], 10<sup>±1</sup>[s])</i>	±[%]	2,0						
Resistance to Soldering Heat <i>IEC60115-1 clause 4.18 (260<sup>±5</sup>[°C], 10<sup>±1</sup>[s])</i>	±[%]	1,0						
Surge Test <i>IEC61000-4-5</i>	±[%]	2,0						
Terminal Strength	±[%]	0,2						
Terminal Tensile Strength	[N]	40	50					
Solderability <i>IEC60068-2-20 (245<sup>±5</sup>[°C] 3<sup>±0,5</sup>[s])</i>		Solder bath method (> 95% coverage)						
Marking <i>IEC60062</i>		Printed in clear						

## FUSE CHARACTERISTICS

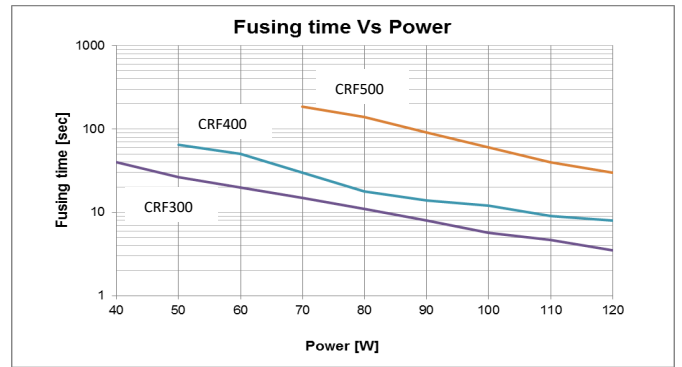
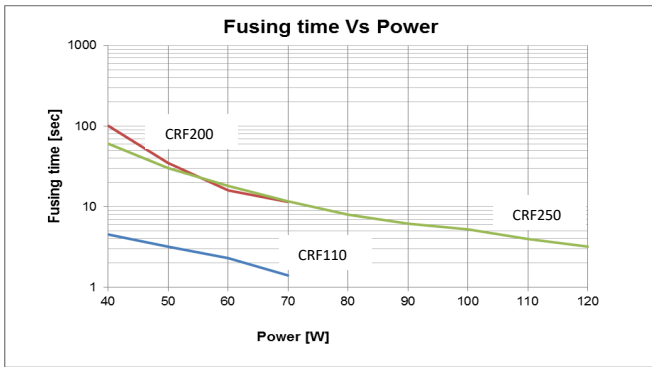
New P/Nr. For UL		CRF110	CRF200	CRF250	CRF300	CRF400	CRF500
Historical P/N	Axial	CRF251-8	CRF252-8	CRF253-8	CRF254-8	CRF256-8	CRF257-8
	SMD	RZS1	RZS2	RZS3	RZS4	RZS6	-----
Resistance Range	230[V]			10R ... 330R	10R ... 330R	10R ... 330R	
	375[V]	1R ... 100R	1R ... 240R				1R ... 330R
	120[V]			10R ... 90R	10R ... 90R	10R ... 90R	
	170[V]	1R ... 100R	1R ... 240R				1R ... 330R

New P/Nr. For Standard		CRF110	CRF200	CRF250	CRF300	CRF400	CRF500
Historical P/N	Axial	CRF251-4	CRF252-4	CRF253-4	CRF254-4	CRF256-4	CRF257-4
Resistance Range		*1R ... 100R	*1R ... 240R	*1R ... 330R	*1R ... 470R	*1R ... 330R	*1R ... 330R

**Note:** The special construction off resistance values >10R results in an immediate interruption (<1s, 200[ms] typical), when mains voltage (120/230[V]<sub>RMS</sub>) is applied. No flames, no explosion. After fusing, the resistance value is 100K.

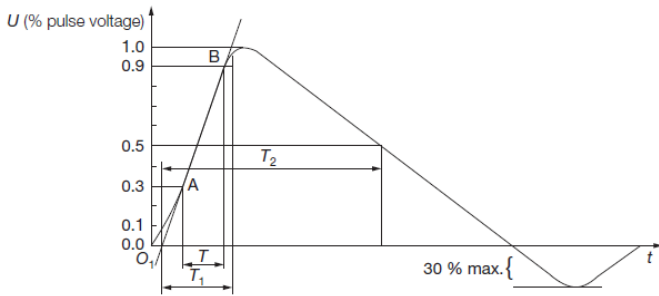
\* The interruption mechanism for resistance values <10R and resistance values >max. range is not clearly defined, also for other voltage. Need to be tested in the final application

# CRF Series Datasheet

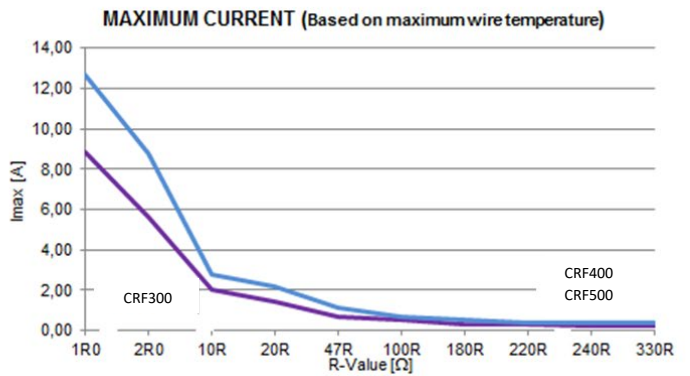
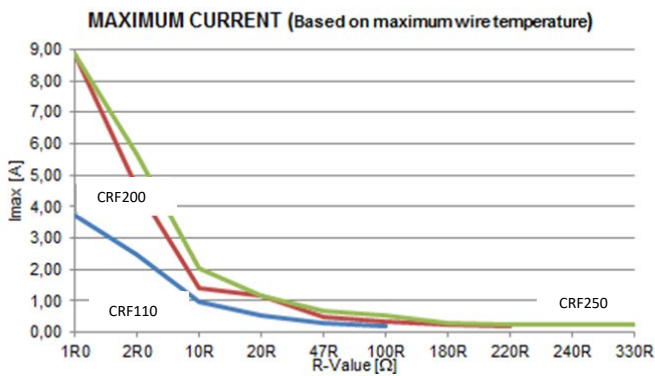
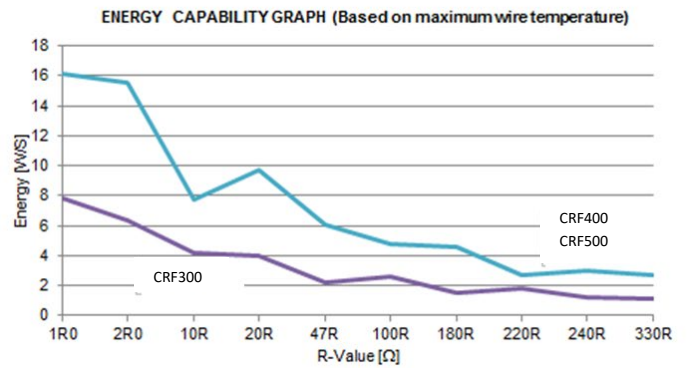
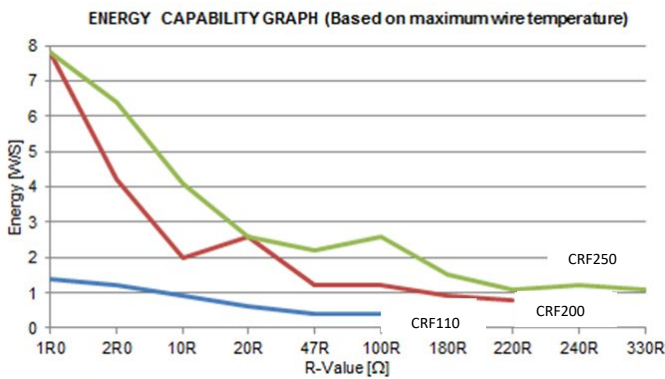


## PULSE PERFORMANCE

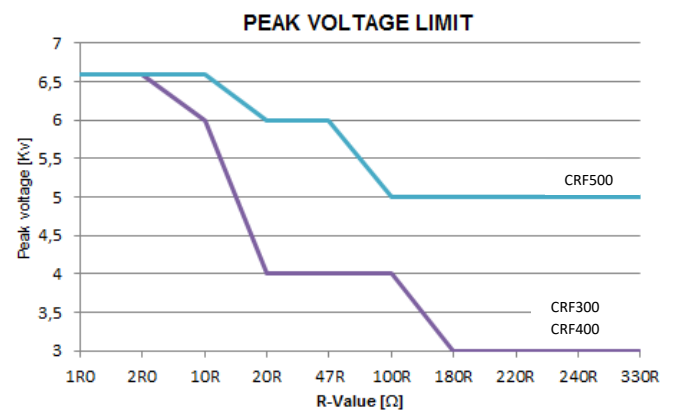
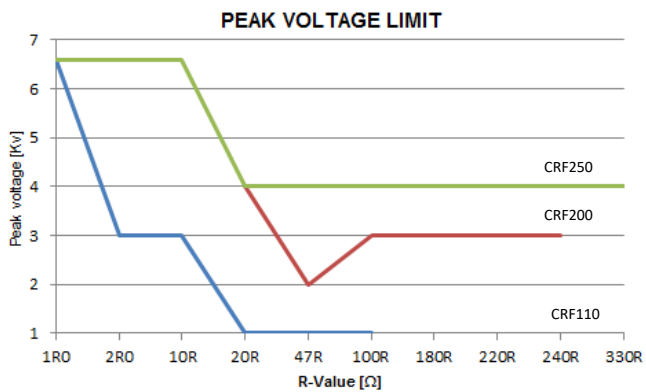
Beside fusible, this resistor also acts as in-rush current limiting for normal operation.



**NOTE:** The voltage shown in the below table, is the net voltage across the resistor. The generator open voltage will be higher due to the generator's internal impedance (12[Ω]).  
Pulse shape – 10 pulses @ 20 [s] interval

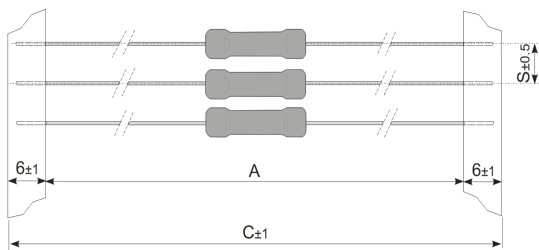


# CRF Series Datasheet



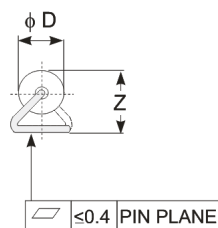
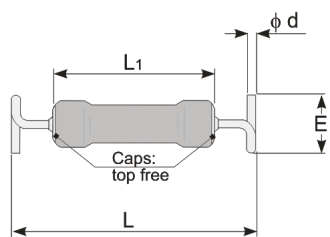
## PACKAGING

The standard packaging for CRF in axial type is taped, dimensions below.

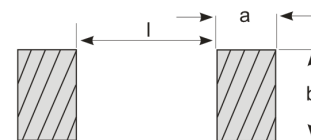


Type	Historical P/N:	Pack Code	Pieces	Forming Type (Inner Taping dim.)	A	C	S
CRF110	CRF251-4 / -8	T = Taped Ammo pack	1000	52-	52	65	5
CRF200	CRF252-4 / -8		1000		52	65	5
CRF250	CRF253-4 / -8		1000	73-	73	85	10
CRF300	CRF254-4 / -8		1000		73	85	10
CRF400	CRF256-4 / -8		1000		73	85	10
CRF500	CRF257-4 / -8		500		73	85	10

## SMD LEAD CONFIGURATIONS

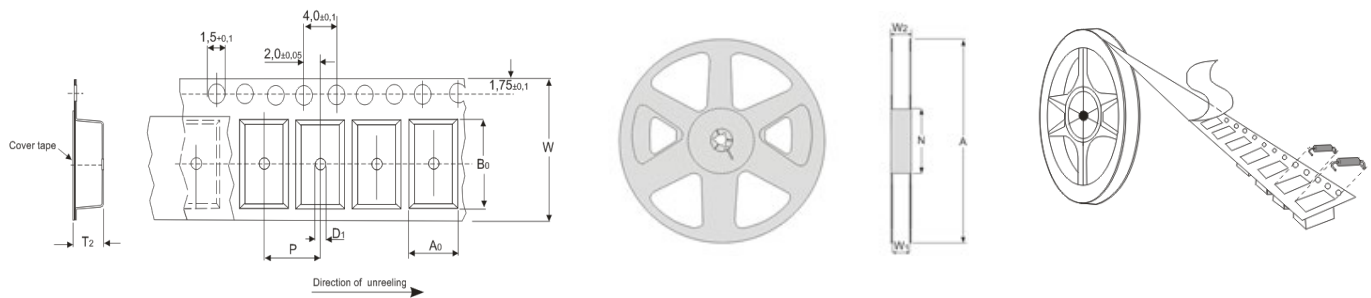


SOLDER PAD



Type	Historical P/N	Size	L	L <sub>1</sub> max.	Ø D max	Ø d ±0,05	E	Z max	l	a	b
CRF110	RZS1	5315	13,4±0,5	9,0	3,0	0,65	5,0±0,5	7,0	10	10	10
CRF200	RZS2	5315		9,7	4,0	0,80					
CRF250	RZS3	6720	17,0±1,0	14,5	4,5	0,65		7,5	14		
CRF300	RZS4	6720		12,6	6,0	0,80					
CRF400	RZS6	8424	20,9±1,0	17,0	6,0	0,80	8,0	16			

# CRF Series Datasheet



Type	A0	B0	W	D1	P	T2
CRF110 CRF200	5,0	13,7	24	2,0	8	7,2
CRF250 CRF300	5,7	16,7	24	2,0	8	7,6
CRF400	6,0	21,4	32	2,0	12	8,1

Type	W1	W2	N	A
CRF110 CRF200	25,4	29,5	90	330
CRF250 CRF300				
CRF400				

Type	Packaging	Pieces
CRF110 CRF200	13(inch) Blister tape	1000
CRF250 CRF300		
CRF400		

## Ordering Code for SMD:

CRF	300	J	K	-	ZB-	150R	UL
Serie	* Power rating	Tol.	Pack-Code	TCR	Forming type	R Value	Special
		J = ±5%	K = Blister Tape Reel	- Base on spec.	ZB- Z version		UL = UL Version

## ALTERNATIVE LEAD CONFIGURATIONS

This type CRF is also available in a different pre-forming, as shown below, other's upon request.

### THOUGH HOLE VERSION

<b>Axial Goal Post (AG-)</b>	<b>Axial Goal Post Kink (AK-)</b>	<b>Radial (RD-)</b>	<b>Radial 2 Kink (RK-)</b>