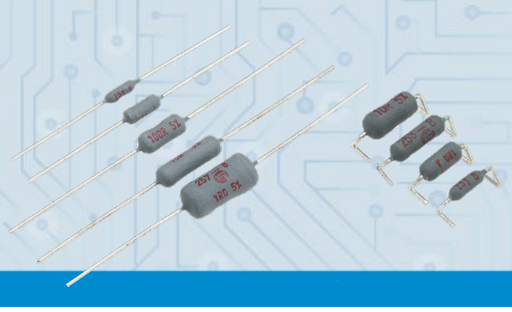
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CRF Series Datasheet

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

ORDERING CODE - Example

New SAP Part Nr.:

CRF	300	J	T	-	73-	150R	UL
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.:

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

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

APPLICATIONS

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

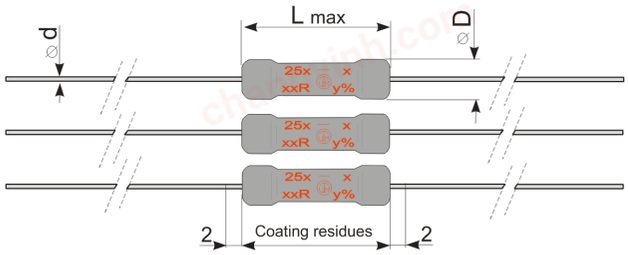
FEATURES

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

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
		AXIAL UL	CRF251-8	CRF252-8	CRF253-8	CRF254-8	CRF256-8	CRF257-8
		SMD	RZS1	RZS2	RZS3	RZS4	RZS6	-----
Nominal Power Rating	* P_{40}	[W]	1,1	2,0	2,5	3,0	4,0	5,0
	P_{70}	[W]	1,0	1,8	2,3	2,7	3,6	4,5
Resistance Range		[Ω]	1R … 100R	1R … 240R	1R … 330R	1R … 470R	1R … 330R	1R … 330R
			(Other values upon request, for CRF UL approval check the ohmic value range below page 2)					
E-Series (preferred)			E24 (Other upon request)					
Tolerances		±[%]	J = 5%					
Temperature Coefficient		±[$10^{-6}*K^{-1}$]	120 ±50					
Working Temperature Range		[ºC]	-55 … +350					
Thermal Resistance		[KW^{-1}]	280	155	122	104	78	62
Max. Working Voltage		$[V]_{RMS}$	$\sqrt{P_{70} \times R}$					
Dielectric Withstanding Voltage IEC115-1 clause 4.7 (1[min])		$[V]_{RMS}$	500					

DIMENSIONS [mm]



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

*R <10R D max.+1

File Nr. 3200.18-450.121.13 | Revision: 202010

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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	[ºC]		70...350 (0W)					
Climatic Category			55/350/56					
Failure Rate *(Total, ϑ_0, max, 60[%] cont. lev.)*	[10^{-9} h^{-1}]		appr. 10 depends on value					
Endurance *IEC60115-1 clause 4.25* *(P_{70} @ 70[°C], 1000[h])*	±[%]		5,0					
Damp Heat, Steady State *IEC60115-1 clause 4.24* *(40[°C], 93[% r.h.], 56[d])*	±[%]		5,0					
Climatic Sequence *IEC60115-1 clause 4.23* *($260^{\pm5}$[°C], $10^{\pm1}$[s])*	±[%]		2,0					
Resistance to Soldering Heat *IEC60115-1 clause 4.18* *($260^{\pm5}$[°C], $10^{\pm1}$[s])*	±[%]		1,0					
Surge Test *IEC61000-4-5*	±[%]		2,0					
Terminal Strength	±[%]		0,2					
Terminal Tensile Strength	[N]		40	50				
Solderability *IEC60068-2-20* *($245^{\pm5}$[ºC] $3^{\pm0.5}$[s])*			Solder bath method (> 95% coverage)					
Marking *IEC60062*			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_{RMS}]) is applied. No flames, no explosion. After fusing, the resistance value Is 100K.

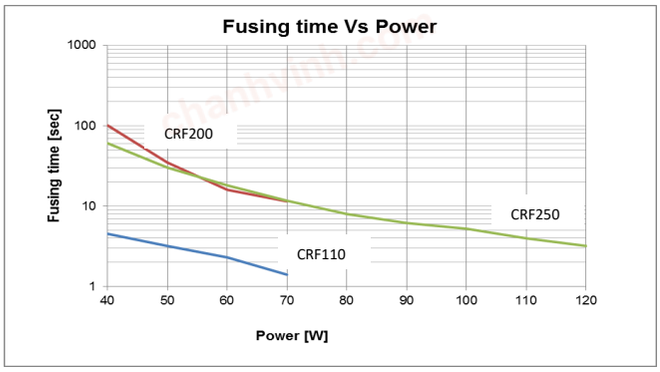
* The interruption mechanism for resistance values <10R and resistance values >max. range is not clearly defined, also for other voltage. Need to be tested in the final application

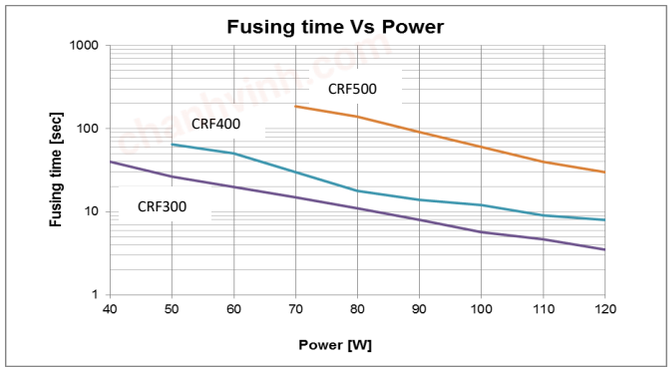
File Nr. 3200.18-450.121.13 | Revision: 202010

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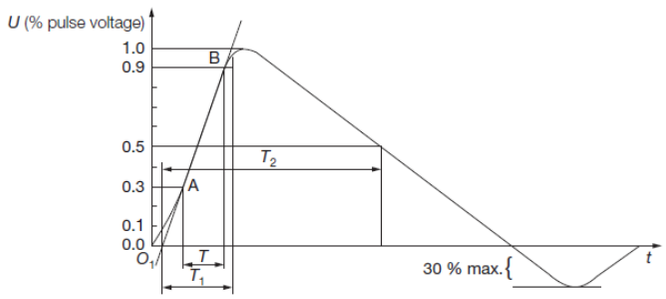
CRF Series Datasheet



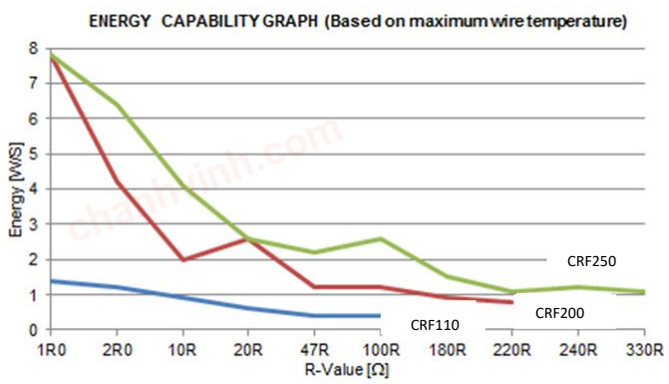


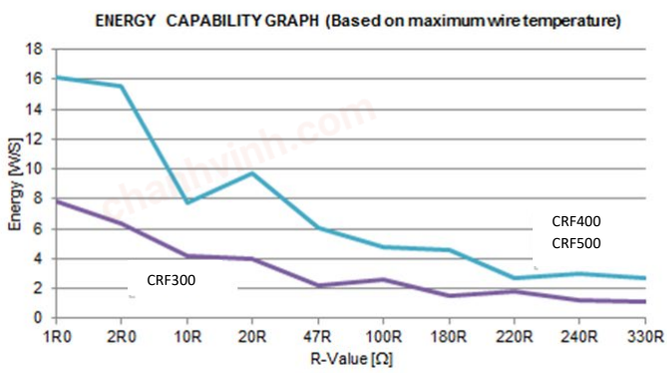
PULSE PERFORMANCE

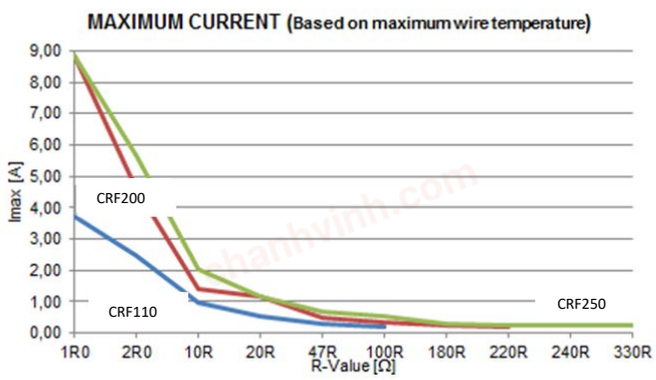
Beside fusible, this resistor also acts as in-rush current limiting for normal operation.

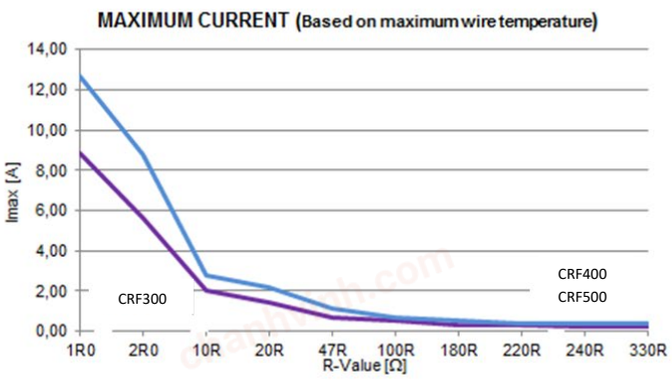


NOTE: The voltage shown in the below table, is the net voltage across the resistor. The generator open voltage will be higher due to the generator's internal impedance (12[Ω]).
Pulse shape – 10 pulses @ 20 [s] interval





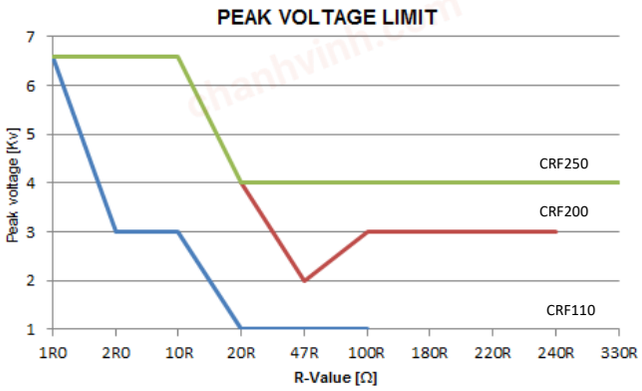


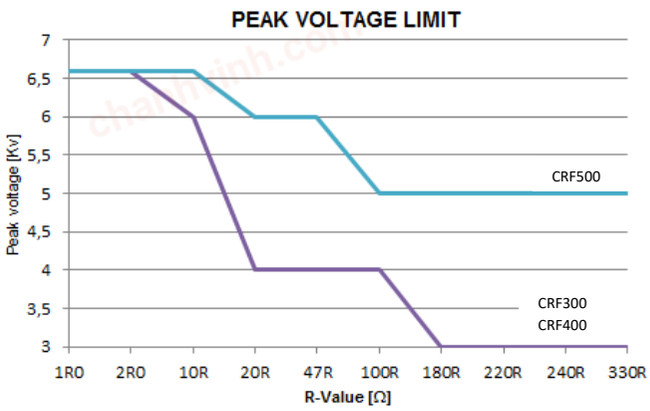


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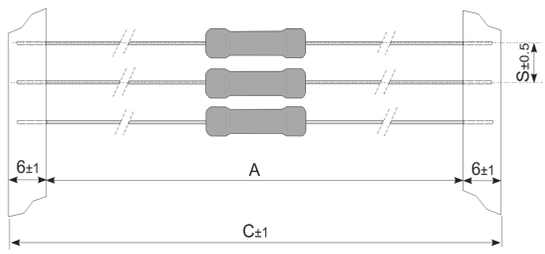
CRF Series Datasheet





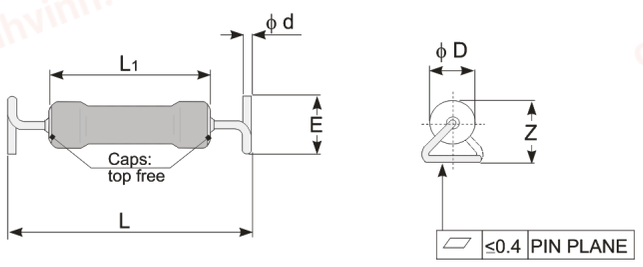
PACKAGING

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



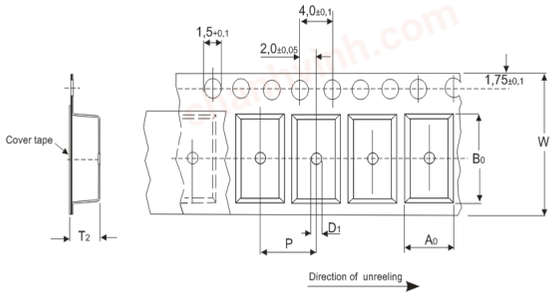
Type	Historical P/N	Size	L	L_1 max.	Ø D max	Ø d ±0,05	E	Z max	l	a	b
CRF110	RZS1	5315	13,4±0,5	9,0	3,0	0,65	5,0±0,5	7,0	10	10	10
CRF200	RZS2	5315		9,7	4,0	0,80					
CRF250	RZS3	6720	17,0±1,0	14,5	4,5	0,65		7,5	14		
CRF300	RZS4	6720		12,6	6,0	0,80					
CRF400	RZS6	8424	20,9±1,0	17,0	6,0	0,80		8,0	16		

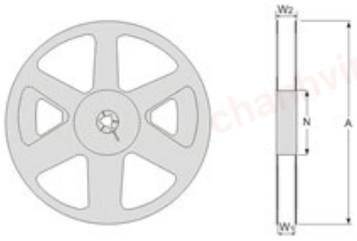
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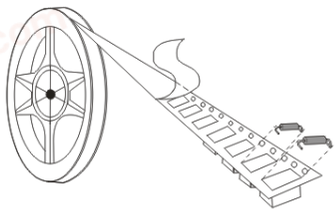
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CRF Series Datasheet







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	33,4	37,4	100	380

Type	Packaging	Pieces
CRF110 CRF200	13(inch) Blister tape	1000
CRF250 CRF300		
CRF400	15(inch) Blister tape	

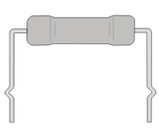
Ordering Code for SMD:

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

			
Axial Goal Post (AG-)	Axial Goal Post Kink (AK-)	Radial (RD-)	Radial 2 Kink (RK-)

File Nr. 3200.18-450.121.13 | Revision: 202010